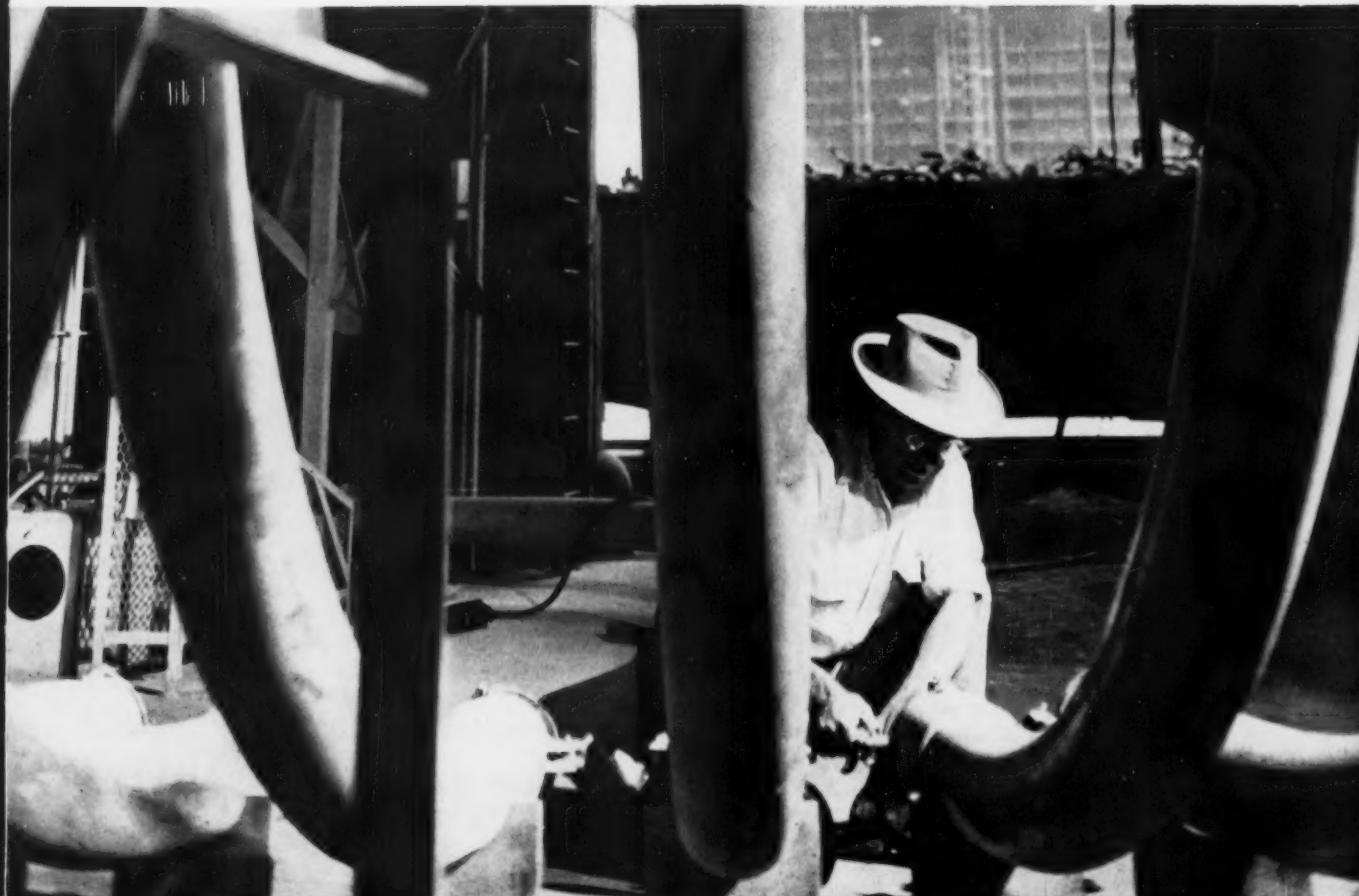


February 14, 1957

The

IRON AGE

The National Metalworking Weekly



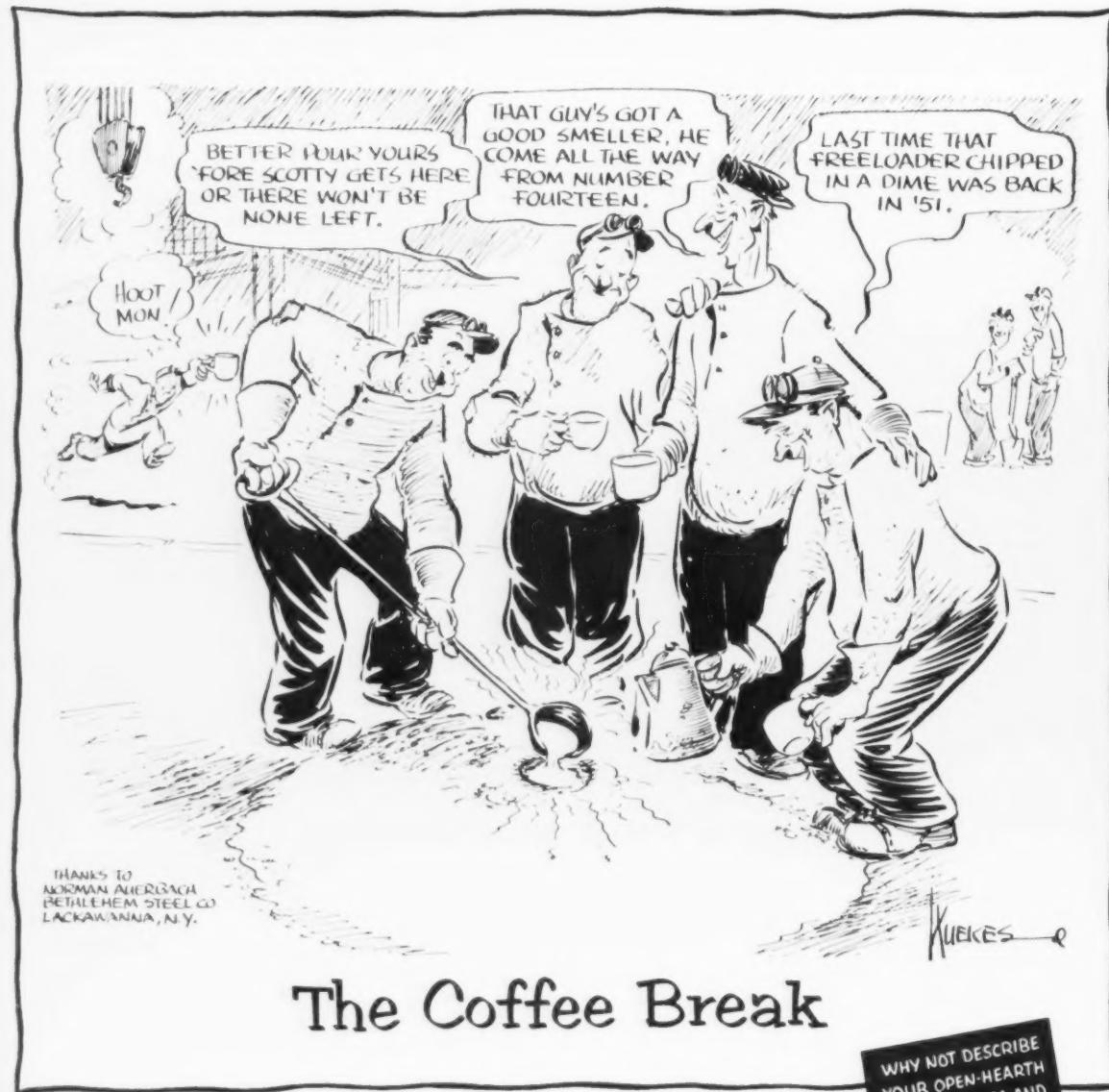
Where And How To Use Air Conveyors P.115

A Case History On Diversification P. 80

Checklist For Better Worker Training P. 75

Digest of the Week P-2

THE OTHER TURN



The benefits steelmakers obtain from our refractories are in part a result of Basic's on-the-job servicing. One of the rewards of this close relationship has been the opportunity to observe and appreciate the lighter side of these usually serious craftsmen.



BASIC INCORPORATED

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Tool Steel Topics

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.



Export Distributor:
Bethlehem Steel Export Corporation



Maker of Parts for TV Sets Gets Good Results with BTR

Here's a job where BTR (Bethlehem Tool Room) tool steel gets a good chance to show what it can do. The multiple-purpose die is used by Suckle Electronics Company, Camden, N. J., to pierce, notch, louver and form high-voltage shields for TV sets. The shields are made of 16-gage steel, and are turned out in a 95-ton press at the rate of more than 400 pieces per hour.

Engineers at Suckle Electronics report

that they are well satisfied with BTR. They particularly like its safe-hardening property, toughness, and ability to wear and wear.

BTR is our general-purpose, manganese-chromium-tungsten grade of oil-hardening tool steel. It's a grade that is consistently racking up substantial shop savings for manufacturers in a wide range of applications. Your Bethlehem tool-steel distributor will be more than pleased to furnish complete information about BTR. Why not give him a phone call right now, while you have it in mind!

CR-MO-W Gets the Okay

After being machined by the end mill, this hot-piercing punch, made of Bethlehem Cr-Mo-W (chrome-moly-tungsten) tool steel, gets final size check by micrometer. Cr-Mo-W, an excellent hot-work steel, contains 5 pct chromium. Because of its characteristics, it is perfectly at home on jobs that involve shock, drastic changes of temperature, and heat-checking.



BETHLEHEM TOOL STEEL ENGINEER SAYS:



Don't Double Everything!

Attempting to double everything may be a wise policy in the investment field. But it can cause trouble when applied to the selection of tool steels. For example, when a successful production line is to be duplicated in larger size, the same grade of steel should not be used for each part without further consideration.

The main difficulty which arises is that the steel for a given part may not have sufficient hardenability when the part is to be made in a larger size. The reason is that tools which have been only partially hardened through will not be as strong as the deeper hardened or through-hardened tools of the original model. Secondly, the use of low-hardenability steels may be troublesome because the larger tools may be under-tempered in attempting to develop the desired degree of surface hardness. You may find that tools which are improperly tempered sometimes crack in treatment, grinding, or in service. Steel for each tool must therefore be selected with reference to the size in which the tool is to be produced.

Feb. 14, 1957—Vol. 179, No. 7

The IRON AGE

Digest of the Week in Metalworking

Starred items are digested at right.

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NEWS DEVELOPMENTS

HOW TO BUILD YOUR SKILLED LABOR FORCE

P. 75

The problem of training well-rounded craftsmen can be solved. However,



organizing and running apprentice training programs take careful planning.

NEW GE MATERIAL IS AS HARD AS DIAMOND

P. 78

New material is called Borazon. It can scratch a diamond, but withstand temperatures up to 3500°F. It has big industrial future in mounting stones in industrial tools.

INDUSTRY PAYING FOR UNDERDEPRECIATION

P. 79

Industry is paying taxes on something like \$6 billion in capital consumption due to underdepreciation. The problem is becoming more acute. Management concern is reviving. Inflation at root of problem.

HOW TO PLAN A

DIVERSIFICATION PROGRAM

P. 80

L. A. Young Spring & Wire Co. was caught in auto supplier squeeze. Well planned diversification program is starting to show dividends. Management thinking on program is blueprinted.

THE IRON AGE



AIR CONVEYORS are getting a lot more attention from the materials handling industry. How these devices can be adapted to a myriad of industrial processes is explained in a special report (P. 115) by E. J. Egan, Jr., Machinery Editor. Fully-integrated handling is the trend today.

TEAMWORK HELPS SELL

NEW PRODUCTS

P. 83

Before a company decides to take on a new product, it should examine closely its own marketing setup. High distribution costs can drain profits. And unless efforts of all departments are aimed at sales, the smoothest production job is doomed to failure. Two experts voice opinions.

FEATURE ARTICLES

NEW X-RAY USE SOLVES

OLD SHOP PROBLEMS

P. 119

An X-Ray diffractometer now being used by metallurgists at the University of Notre Dame has already helped improve a long list of metalworking processes. The machine does the work of two other instruments—the powder camera and the microphotometer. It is making X-Ray diffraction a more quantitative tool.

HIGH-NICKEL ELECTRODE WELDS

DISSIMILAR METALS

P. 122

By joining dissimilar metals, you use high-cost materials only where you really need them. This can save big money. But such joints often call for special equipment and electrodes. So, up go your costs again. Shops now report using a high-nickel electrode that joins most dissimilar metals the easy way. One big reason: Only one type electrode is needed for most jobs.

WHEN IS AN UNDERDRIVE PRESS

A GOOD BUY?

P. 124

An underdrive press isn't any cheaper or faster than its overhead drive counterpart. However, if you have basement room for the low-slung mechanism, it can save you money. For example, you can reduce main floor ceiling height. This cuts building costs and brings down fuel bills.

HOW TO MARK A HARD-TO-LABEL PART

LABEL PART

P. 127

Many a hard-to-label product goes off to market today carrying no permanent identifying marks. A simple, permanent marking system would help make product name, grade, and size instantly identifiable to users. Here's how one company licked problems of labeling chain.

FOUNDRY BRAINSTORMS SOLVE

PRODUCTION KNOTS

P. 128

Despite modern advances, you still have to bring as much art as science to bear on tricky metalworking problems. And generally, the earlier you bring on that old-fashioned know-how, the better. Here's how one foundry preplanned its way around some tricky problems.

MARKETS AND PRICES

EDSEL MARKETING PLANS

TAKE SHAPE

P. 92

Rumors floating around industry about the status of Ford Motor Co.'s new Edsel model are set straight by R. E. Krafve, division manager. The new car will have four price classes comprising 18 models. Introduction is still scheduled for this fall.

TAFT-HARTLEY ACTION IS

SLOW COMING

P. 97

President Eisenhower is winning some converts to proposals for moderate change in T-H law. However, action this year is unlikely. By 1958 the White House will have won enough support to ram through some far-reaching changes.

FARWEST AUTO ASSEMBLY

PLANTS ARE BUSY

P. 99

Now supplying 10 pct of the nation's car needs, the West Coast assemblers are kept quite busy. However, thanks to area's population gains, they'll be even busier. Ford and GM are expanding their operations.

PLENTY OF ROOM FOR

MACHINING EDUCATION

P. 101

Many machine shops are still working with equipment up to 50 years old. Others, equipped with modern machines, don't know how to take full advantage of carbide tools. There's a big education job ahead for builders.

NO SHARP DROP IN STEEL

DEMAND THIS YEAR

P. 175

A sharp decline in steel demand is out of the question this year. Easing demand for some products reflects a return to normal seasonal influences. Sheet and strip users, especially the automotive industry, are reducing inventories. But consumption continues high.

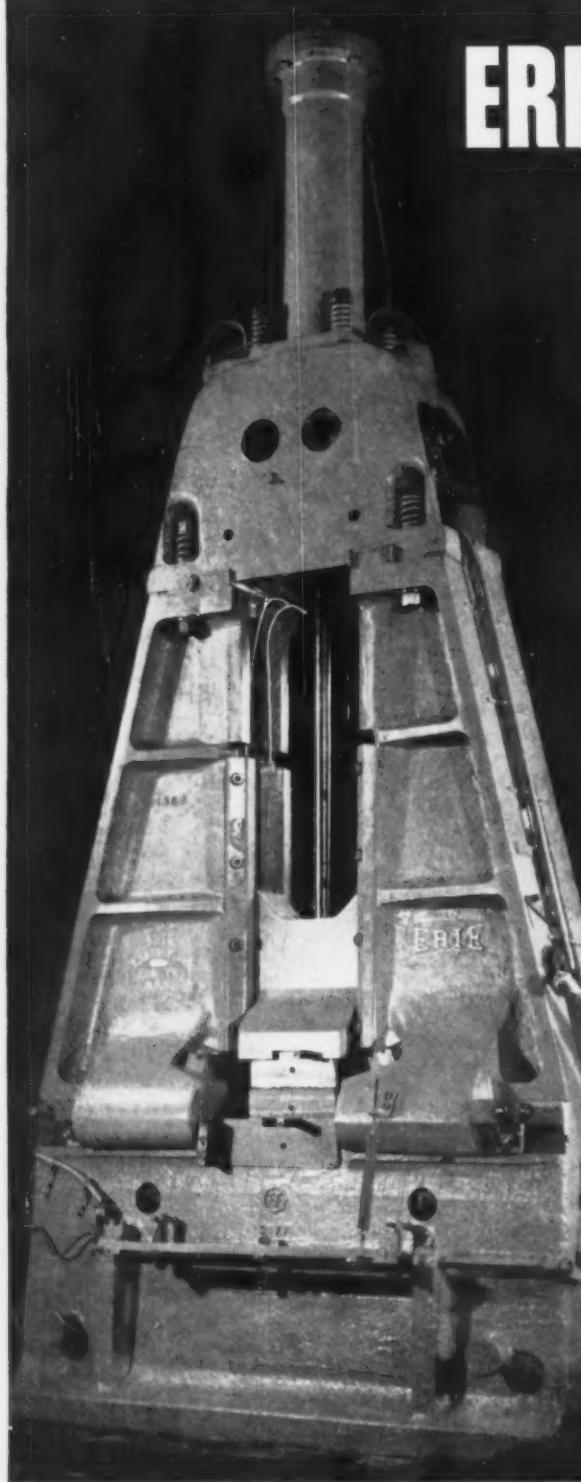
NEXT WEEK:

IS PLANT NOISE REDUCING YOUR EFFICIENCY?

Industry is becoming painfully aware of the high cost of noise in terms of productivity and worker hearing. Next week's special report tells what some producers, insurance companies, and doctors are doing about it.



ERIE RIGIDROP FORGES FASTER



NEW ALL-STEEL GRAVITY DROP HAMMER WITH VARIABLE STROKE CONTROL STRIKES MORE BLOWS PER MINUTE

One drop forge shop reports production increases averaging better than 10% with their RIGIDROP. No more waiting time in the handling cycle with Rigidrop's increased forging speed—the direct result of greater piston area per hammer rating, plus Rigidrop's variable stroke control.

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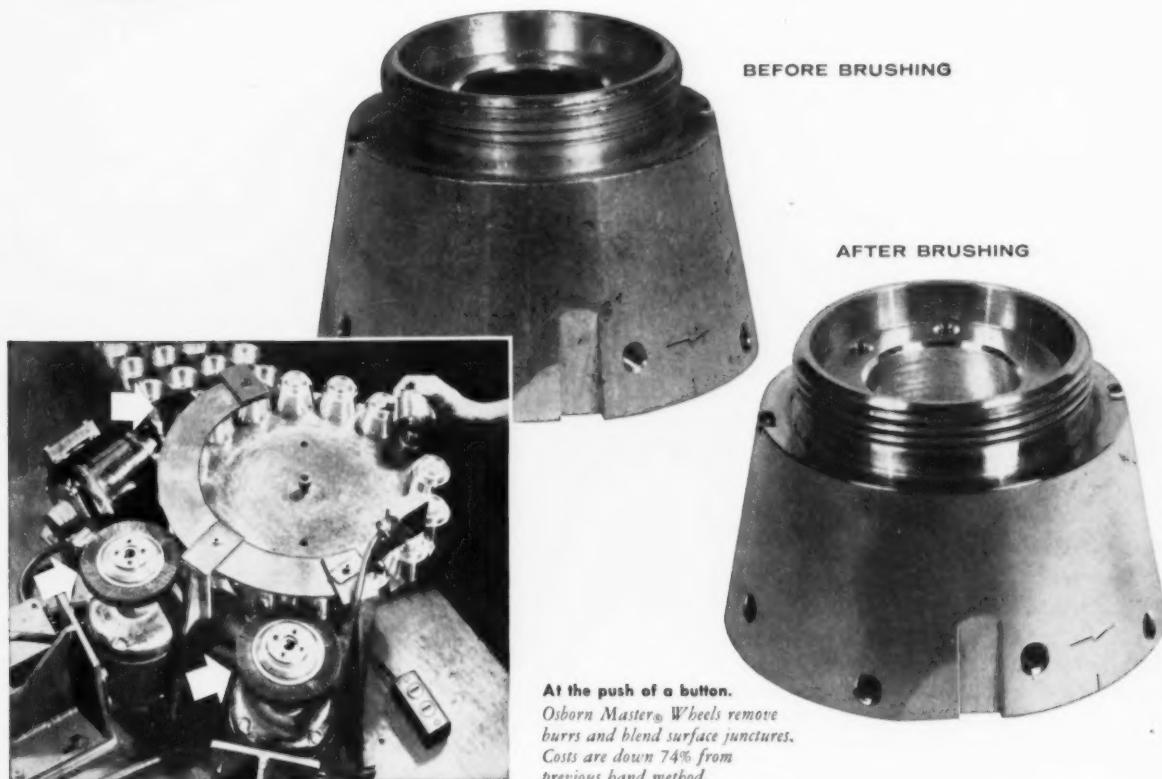
You are invited—This 3000-lb. RIGIDROP can be inspected at the Erie Foundry factory. You are invited to come to Erie and operate this hammer—see for yourself how the new RIGIDROP with variable stroke control can forge faster. Call or write James A. Currie, president, for an appointment.

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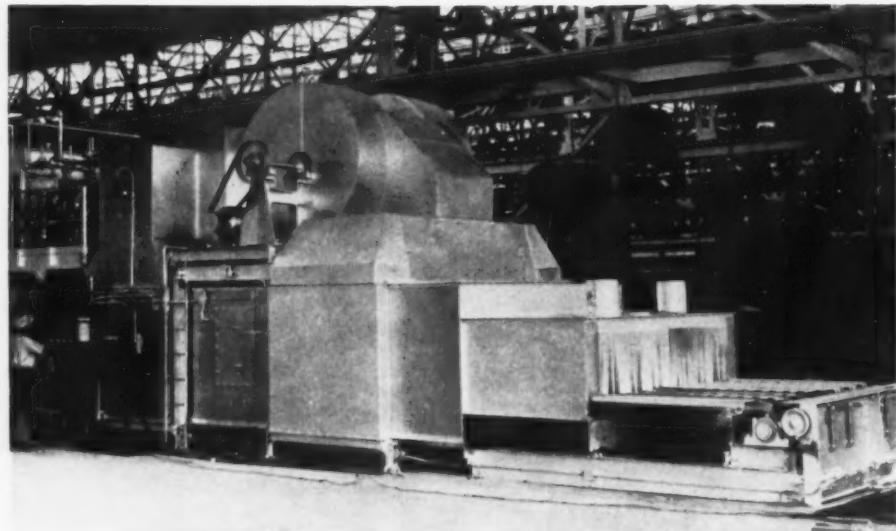
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and the Engineering Index.



EDITORIAL

That Depression Isn't Here Yet!

♦ TALK ABOUT the coming depression and how it will curl your hair makes good conversation. It can get the best of you, though, if you dwell too long upon it: It isn't likely that talking about poor times will bring them down upon us. But such talk won't help matters much.

Recently a large section of the business press and management has started questioning the "glorious future" about which we have heard so much. Those who believe we have licked depressions are not particularly in vogue this week.

This is a healthy reaction to the "unending boom" conversational trend of the past year. If we know what we are talking about and do not let our emotions run away with us, talk is cheap. But it can be costly too.

If you ran for shelter in 1954 and scrapped your plans for new machinery, you may be sorry now. The difference in cost today from what you could have had for the same amount three years ago is painful to recall.

There are two things to ponder today—the near view and the long view. Some people get these views mixed up. Their fears and anxieties often upset logical long term expansion plans.

The near view is that the boom has crested—for a while anyway. That is probably good for all of us. It now seems clear that we will knock on the ceiling for awhile before we decide if we are to go up, go down or maintain a record plateau.

The long-term view is that our population is growing so fast that we can't afford to slow down too often. There is much which has to be replaced quickly. The future for new products, new services and new techniques is almost limitless.

Our plant and equipment are wearing out rapidly in many sectors of the economy. Now would be a poor time to again abandon the sensible and necessary plans we have made to take care of future costs and competition.

The depression isn't here yet. The expansion and replacement you are thinking about will cost more, not less, in the future. Don't make the mistake of confusing the short-term with the long-term picture. It could be a costly misjudgment.

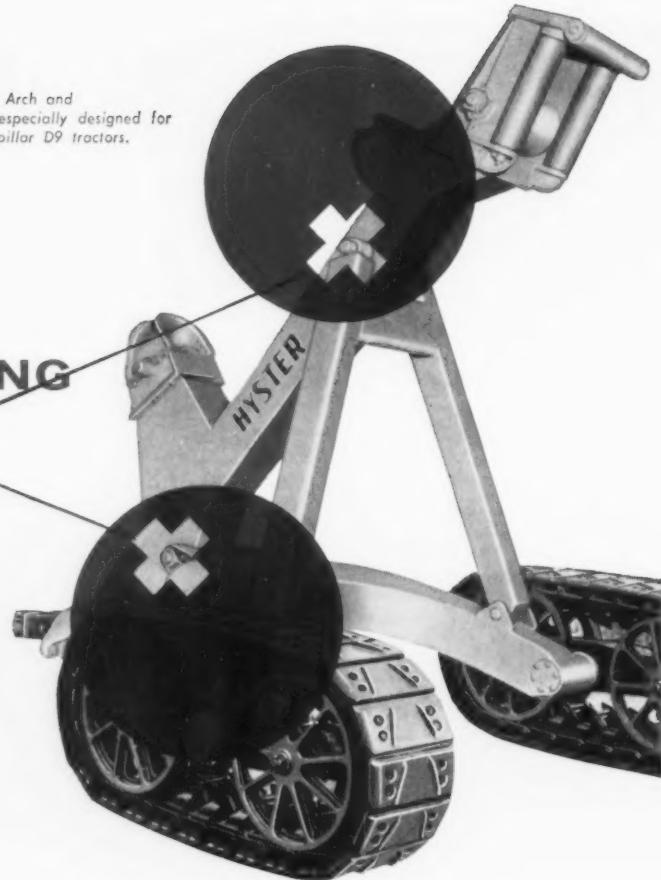
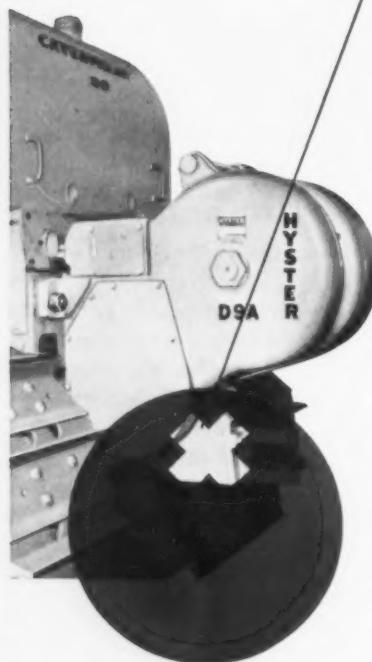
EDITOR-IN-CHIEF



Hyster '98' Logging Arch and
D9A Towing Winch especially designed for
operation with Caterpillar D9 tractors.

by switching to
OSTUCO TUBING

here and here...



Hyster Company Makes Double-Cut on Costs!

Hyster Company, Portland, Oregon, out to beat machining costs of components in their logging arches and winches and a drawbar bracket, turned the trick by switching from another material to OSTUCO Seamless Steel Tubing.

Drawbar Bracket—Use of OSTUCO Tubing cut material and machining costs from \$120,500 to \$81,820 annually for a reduction of 32%.

Logging Arch—Used as sleeves in the Hyster '98' Arch, OSTUCO Tubing reduced material and manpower costs 10% annually.

In addition, Hyster engineers report the equipment is stronger and better able to take the strain of heavy hauling and winching jobs over rough logging terrain.

Perhaps you have hidden profit-robbers in your product. Better contact OHIO SEAMLESS for recommendations . . . without obligation on your part, of course.

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dear editor:

letters from readers

How High Is Up?

Sir:

At a time when so many are talking in terms of inflation, recession and overextension of credit, I feel that your Jan. 24 editorial "How High Is Up These Days," is particularly appropriate.

Since the end of World War II, our country has enjoyed a healthy and even boom economy. It is true that this prosperity must not be taken for granted nor would it be wise to lull ourselves into a sense of false security by believing that there will never be any adjustments or setbacks in our economic future.

It is a wise individual who makes it a practice of getting periodic medical checkups, notwithstanding the fact that he is apparently enjoying sound health. In business too, it is wise to make careful periodic surveys of market potentials, inventories, etc. and not to go along blindly feeling that all is well and always will be. However, as a neurotic can worry himself into being ill, so can we throw ourselves into a recession by continually harping on inflation, tight money, etc. Pessimism is contagious.

Our future economic health, as our freedom itself, is something that must be worked for and earned. *J. H. Reeve, Purchasing Agent, Frick Co., Waynesboro, Pa.*

Simplified Drafting

Sir:

We would appreciate receiving several copies of the article "How to Simplify Engineering Drawings" from the Dec. 27 issue.

We look forward with great pleasure to each issue of THE IRON AGE as it contains so many interesting articles, and information valuable to us. *G. Granger, Inspection Dept., Motorola Inc., Phoenix, Ariz.*

Beat the Bushes

Sir:

Once again we would like to reproduce one of your editorials—namely, the one which appeared in the Jan. 10 issue of THE IRON AGE, "You Must Still Beat the Bushes!" It is our wish to distribute this to all of our commercial steel sales organization.

These men have access to THE IRON AGE but I'm not sure they all read your editorial each week—and we want to make sure that this is one they do see. *J. N. Counter, Gen. Mgr. Commercial Steel Sales, Western Div., The Colorado Fuel and Iron Corp., Denver, Colo.*

Permission granted.—Ed.

Executive Pay

Sir:

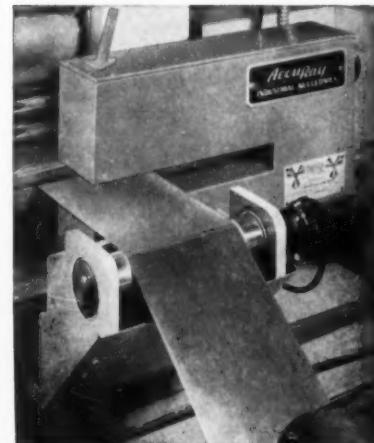
Read your splendid article "How to Figure Executive Pay," in the Dec. 13 issue. I would appreciate your sending three copies to my attention. *M. A. Deane, Chief Engr., Michigan Steel Tube Products Co., Detroit, Mich.*



"Harry holds a very responsible position. Whenever anything goes wrong they hold him responsible!"



UNIFORM AS THE ATOM



Somers Thin Strip now Gauged by Nuclear Energy

To meet the increasing demands of electronics and other industries for uniform closer tolerances, Somers Brass has taken advantage of one of the latest developments in the electronic field by installing the first Accu-Ray gauges in the non-ferrous industry. These units make it possible to check and control thickness from edge to edge throughout each coil to a degree of accuracy never before known.

Accu-Ray gauging is typical of the modern methods Somers combines with engineering experience to provide thin strip metal to your most rigid specifications. Nickel, Monel, and Nickel Alloys from .020" to .00075". Brass, Bronze, Copper and Alloys from .010" to .00075".

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Only a fraction of the cost of conventional Male & Female Dies. The larger the die the greater the proportionate savings.

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FROM

2 TO 5 DAYS



MINIMUM PRODUCTION ON STEEL AND SIMILAR METALS

THICKNESS	MINIMUM	MAXIMUM
1/32 STEEL	100,000	UNKNOWN
1/16 STEEL	100,000	UNKNOWN
3/32 STEEL	75,000	UNKNOWN
1/8 STEEL	50,000	UNKNOWN

MAXIMUM UNKNOWN AS DIES HAVE
NEVER BEEN RUN TO DESTRUCTION

MINIMUM PRODUCTION ON ALUMINUM AND SIMILAR METALS

THICKNESS	MINIMUM	MAXIMUM
1/16 ALUMINUM	125,000	UNKNOWN
3/32 ALUMINUM	100,000	UNKNOWN
1/8 ALUMINUM	75,000	UNKNOWN
5/32 ALUMINUM	50,000	UNKNOWN
3/16 ALUMINUM	40,000	UNKNOWN

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OVER A QUARTER OF A CENTURY OF DIE MAKING SERVICE TO INDUSTRY

fatigue cracks

Be Your Own Expert

Second-guessing the experts is a lot of fun. In fact, it's almost a national pastime. From Monday-morning quarterbacking to doping out the Kremlin's next move, there's nothing like pitting your judgment against those "in the know."

"You Arbitrate It" on p. 140 gives you another crack at matching wits with some of the best labor arbitrators in the country. This new series, based on case histories from the files of the American Arbitration Assn., now appears in the second issue of **THE IRON AGE** each month.

How would you solve the case of the Sloppy Spray Painter? To find out what it's all about turn to p. 140. And there's no waiting to check your answer with the experts. It's right there on the same page.

Air Travel—1957

Have you any idea of how many things metalworking plants move from place to place by means of air conveyors? We didn't until a couple of months ago. The revelation—a list as long as your arm—turned up in a recent survey report prepared by Oliver Johnson, market research director of **THE IRON AGE**.

Behind the Facts

First off, we were surprised to learn that typical plants in about 40 different metal industry classifications use air conveyors. That takes in about everything you can think of, from steel mills to folks who produce pins and needles.

Then we discovered that pneumatic systems divide roughly into two types.

One type sticks primarily to the handling of bulk materials. This includes practically anything that's dry and light enough to be carried through a tube on a continuous stream of air. The second type

involves moving one thing—or maybe several things—at a time. Call it batch conveying.

But there was something even more revealing in Oliver's survey than the number and variety of plants that use air conveyors, and the things they do with them. It was the number of people who said they had given some thought to this material-handling technique and wanted to know more about it.

That's all we need to hear—that enough folks want more information about something. Hence, a prompt decision to do a complete



Lamson Corp.

Air Conveyor shoots heat samples to metallurgical lab at Scoville Mfg. Co.

roundup story.

Digging behind the facts and figures of the original survey the editors turned up any number of air conveyor uses and benefits for you to ponder. You'll find them beginning on p. 115.

New Puzzler

A man wanted to build a race track with only one circular segment and with both tangents meeting at a point; each tangent and the circular segment to be of equal length, one-third of a mile each. What would be the radius of the curved portion of the track?

NEEDS:

new design
for crucial

metal cleaning
and treating



SELECTION:
Cincinnati

You can't afford to take chances on over 2,345 sq. ft. of metal cleaning equipment. That's why Briggs & Stratton Corp., the world's largest manufacturer of 4-cycle, single cylinder, gasoline engines insisted on **CINCINNATI**. Ingenious use of suspended, platform-mounted and U-shaped units with transfer conveyors fits all 4 machines into just 765 sq. ft., reduces manpower and maintenance.

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...its effect on
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To marketers, stainless steel combines the smart selling values of beauty and easy maintenance with the hard selling values of superior corrosion resistance, durability and toughness.

Stainless steel is available in countless work-saving standard shapes. It's readily machined, formed, joined, or cast.

For more facts about stainless steel and the contribution it can make to your product or marketing problems, see your stainless steel supplier or write ELECTROMET—leading producer of more than 100 alloys for the metal industries, including chromium and manganese used for making stainless steels.

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FERRO-ALLOYS AND METALS



Stainless steel styling...first to catch the eye and quickest to capture the heart of the consumer. It combines beauty with hardness and strength to resist denting and scratching—and rust is never a problem.



dates to remember

FEBRUARY

The Institute of Surplus Dealers—Sixth annual trade show and convention, Feb. 16-19, New York. Society headquarters, 673 Broadway, New York.

American Institute of Mining and Metallurgical and Petroleum Engineers—Annual meeting, Feb. 24-28, Roosevelt and Jung Hotels, New Orleans, La. Society headquarters, 29 W. 39th St., New York.

MARCH

American Institute of Chemical Engineers—National meeting, March 3-6, The Greenbrier, White Sulphur Springs, W. Va. Society headquarters, 25 W. 45th St., New York.

EXPOSITIONS

1957 Nuclear Congress—March 11-15, Philadelphia.

American Society for Metals—March 25-29, Los Angeles.

American Foundrymen's Society—May 6-10, Cincinnati.

Society of Automotive Engineers, Inc.—National passenger car, body and materials meeting, March 5-7, Sheraton-Cadillac Hotel, Detroit. Society headquarters, 485 Lexington Ave., New York.

American Machine Tool Distributors' Assn.—Spring meeting, March 6-7, El Mirador Hotel, Palm Springs, Calif. Assn. headquarters, 1900 Arch St., Philadelphia.

Pressed Metal Institute—Technical meeting, March 6-8, Hotel Carter, Cleveland. Society headquarters, 3673 Lee Rd., Cleveland.

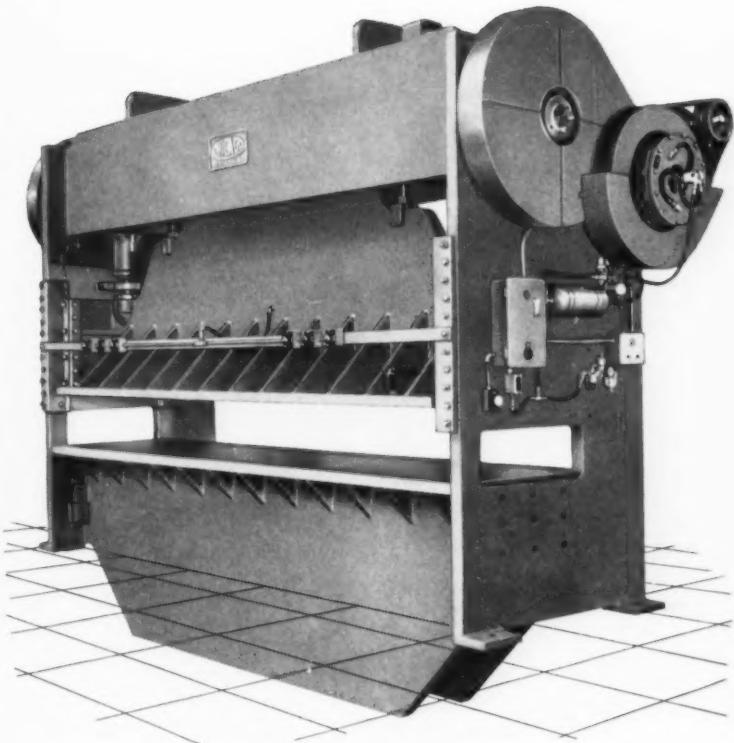
National Assn. of Waste Material Dealers, Inc.—Annual convention, March 10-13, Hotel Conrad Hilton, Chicago. Assn. headquarters, 271 Madison Ave., New York.

Steel Founders' Society of America—Annual meeting, March 18-19, Drake Hotel, Chicago. Society headquarters, 606 Terminal Tower, Cleveland.

American Institute of Mining, Metallurgical and Petroleum Engineers, Inc.—Regional meeting, March 18-19, Rackham Bldg., Detroit. Society headquarters, 29 West 39th St., New York.

APRIL

The American Society of Mechanical Engineers—Spring meeting, April 8-10, Dinkler-Tutwiler, Birmingham, Ala. Society headquarters, 29 W. 39th St., New York.



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*large die area
capacities up to 400 tons*

This is a typical model of CHICAGO straight-side-type presses used for multiple punching, notching, and trimming operations. This press with a die area of 48 inches by 198 inches has a capacity of 200 tons.

Complete recommendations for any job on request.

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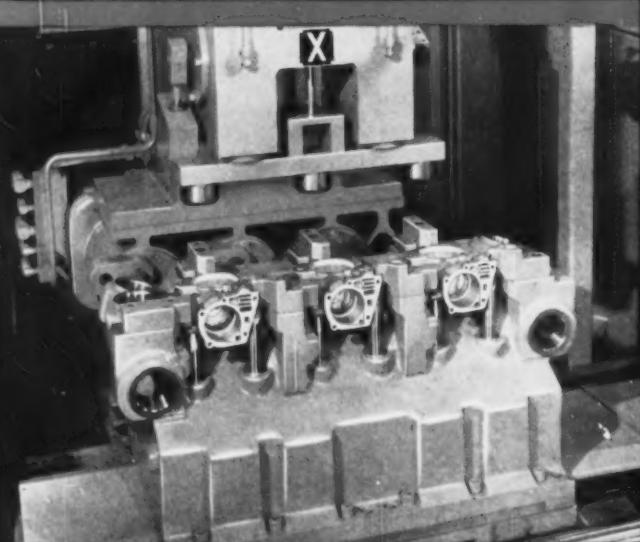
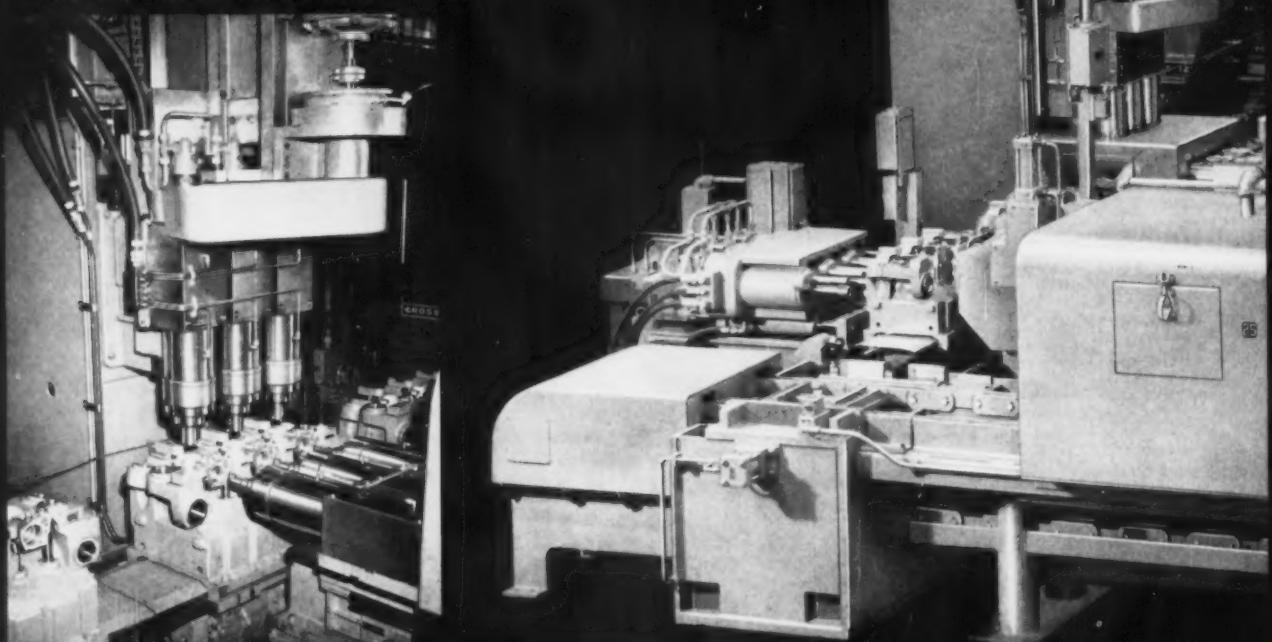
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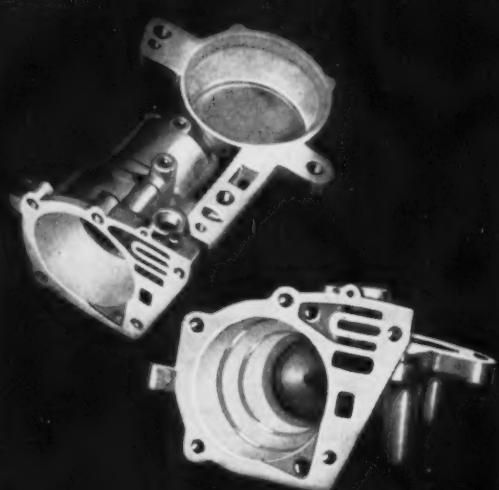
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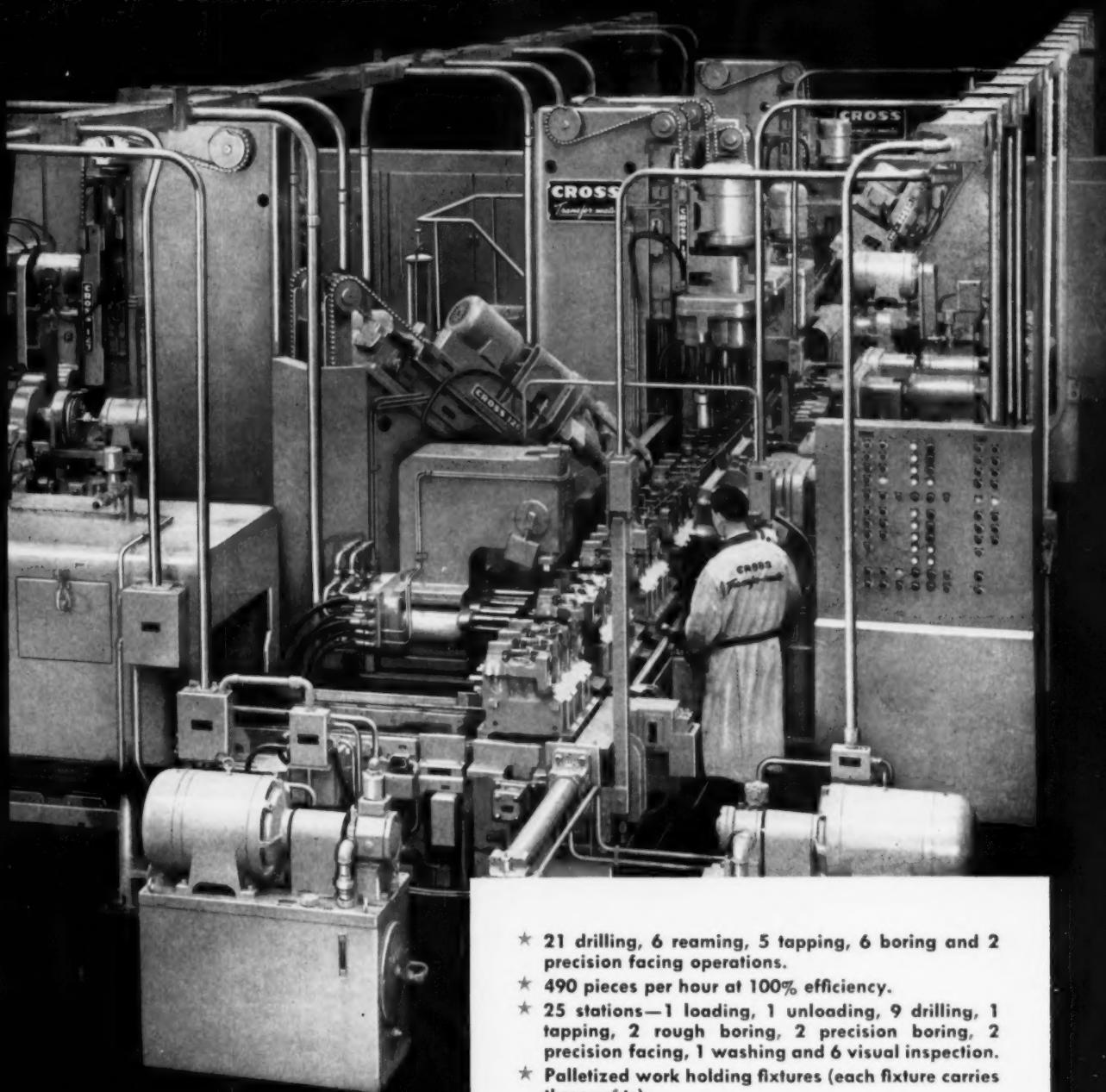
The final precision boring station.



The loading station. Part locations are checked automatically by Unit X to assure proper clamping.



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First in Automation
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- ★ 21 drilling, 6 reaming, 5 tapping, 6 boring and 2 precision facing operations.
- ★ 490 pieces per hour at 100% efficiency.
- ★ 25 stations—1 loading, 1 unloading, 9 drilling, 5 tapping, 2 rough boring, 2 precision boring, 2 precision facing, 1 washing and 6 visual inspection.
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- ★ Complete interchangeability of all standard and special parts for easy maintenance.
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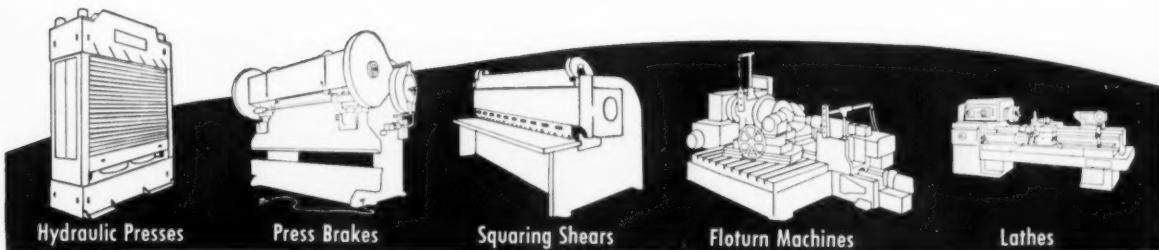


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Keep the operator out front for maximum production!

That's why one user calls the space in front of his Lodge & Shipley Shear the "Production Zone." With all adjustments in front and all clear behind the shear, the operator stays out front and on top of the shearing job. Necessary adjustments can be made quickly . . . scrap or cut pieces can be removed from the back of the shear by hand, truck or even conveyor.

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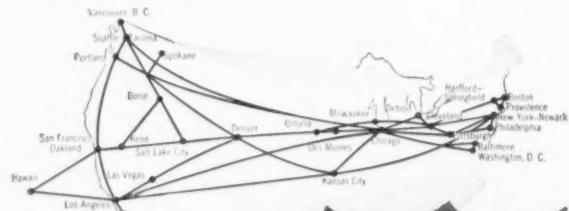
There's assurance, too, in United's frequent, high-speed Air Freight schedules, including same-day DC-7 Mainliners and 30,000-lb.-capacity DC-6A Cargoliners coast to coast. All this is part of the new standard in Air Freight set by United. Specify UAL† on your next airbill, then notice the difference.

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SAN FRANCISCO to BOSTON	\$27.00

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If grinding wheel problems have you in a bearish mood—or even out on a limb—stop growling. Switch to CINCINNATI (PD)[®] WHEELS. For now CINCINNATI Grinding Wheels offer POSITIVE DUPLICATION—a remarkable achievement in precision manufacturing and quality control that can save you money... and increase your production.

Through the CINCINNATI (PD) Manufacturing Process you are assured Positive Duplication of the original wheel *every time* you reorder. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

Yet CINCINNATI (PD) WHEELS are *priced no higher than ordinary wheels.*

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Remember—*only* CINCINNATI Grinding Wheels give you ...



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IT'S EASY to reduce annoying and expensive oil leakage like that shown here. The simple act of switching to a Suntac oil — without making any other changes — can cut leakage an average of 35%...sometimes 90%!

SUNTAC STOPS SHUTDOWN CAUSED BY OIL LEAKAGE

A manufacturer was having trouble with oil leakage and throw-off from bearings of overhead shafting. This resulted in hazardous conditions and low employee morale. Production had to be shut down frequently. Oil costs were high.

A switch to a Suntac lubricating oil solved these problems.*

If you're losing oil through excessive leakage from rotating or sliding parts, a Suntac oil can cut your consumption an average of 35%. These oils are especially compounded to reduce drip, throw-off, squeeze-out; their greater adhesiveness enables them to cling firmly to the parts...as they lubricate.

Suntac oils can reduce consumption up to 90% when used in hydraulic systems, circulating systems, and in other continuous use applications.

For further information on versatile Suntac oils, see your Sun representative or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. IA-2.



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SYSTEM OF YALE TRUCKS AND HOISTS ASSURES SMOOTH, INTRA-PLANT HANDLING OF MATERIALS

In metal-working plants where bulky, awkward and heavy loads must be moved at a steady pace, Yale Trucks and Hoists provide speed, safety and handling ease—three essential factors for an efficient handling operation. Yale Trucks have the power and stamina for heavy-duty, ramp handling. Their ease of operation permits the driver to maneuver his truck in congested areas and spot loads accurately.

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many hoists suited to intra-plant operations. The Yale Cable King Electric Hoist, for example, handles up to 15 tons...gives quick-response pushbutton action...is equipped with Yale's exclusive air-cooling system to prevent overheating during continuous work cycles.

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The great array of fine equipment and machinery of which they are a part is indicative of the wide range of types and sizes of Illinois Gears . . . America's most complete line of gears.

Regardless of the service, whether it's gears for rotating massive shovels, or gears that control delicate precision equipment — depend on ILLINOIS GEARS.

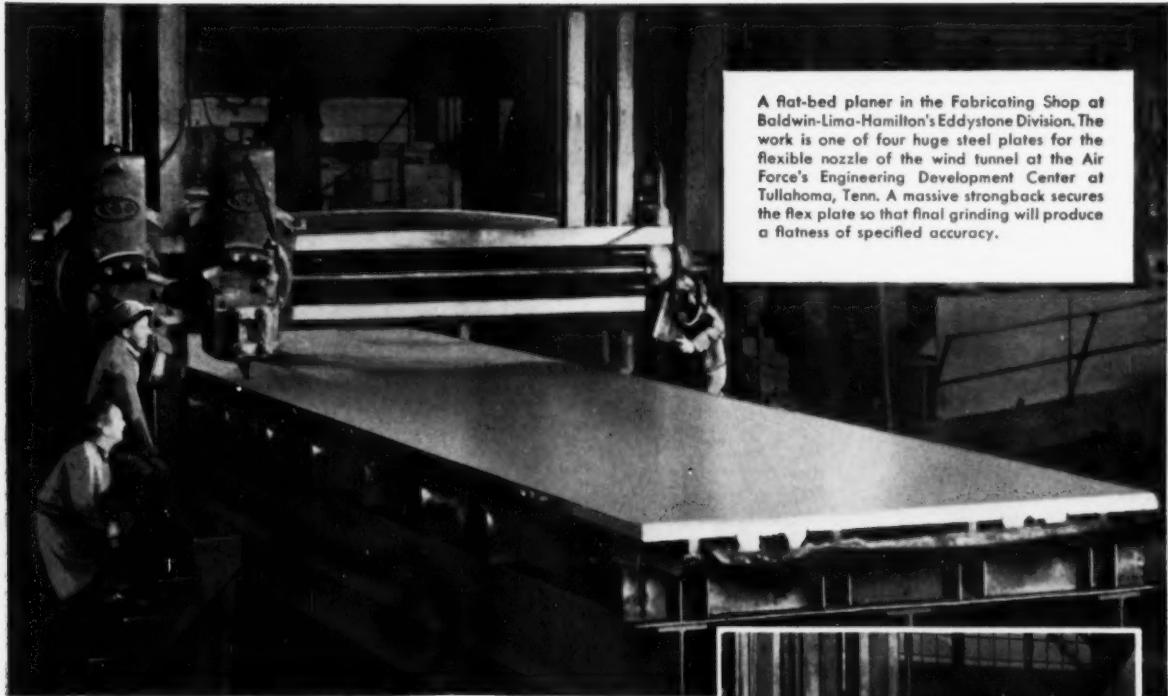
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A flat-bed planer in the Fabricating Shop at Baldwin-Lima-Hamilton's Eddystone Division. The work is one of four huge steel plates for the flexible nozzle of the wind tunnel at the Air Force's Engineering Development Center at Tullahoma, Tenn. A massive strongback secures the flex plate so that final grinding will produce a flatness of specified accuracy.

For transonic wind tunnel nozzle

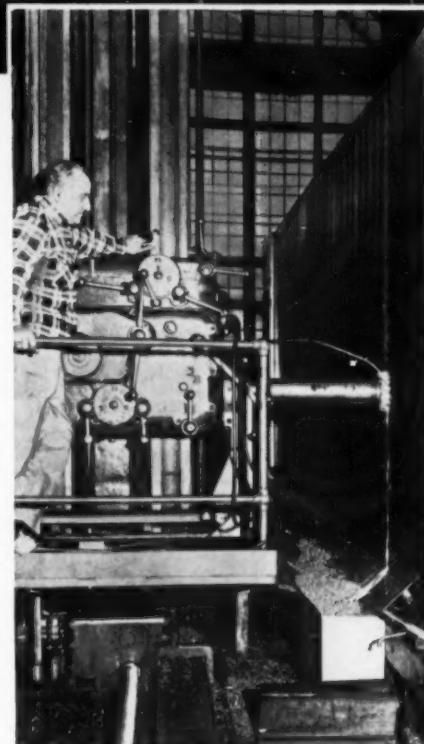
Baldwin machines steel plates 57 ft. x 8 ft. x .850 in. to thickness of $\pm .030$ in. tolerance

Machining the flexible steel plates for the nozzle of the Propulsion Wind Tunnel at the U.S. Air Force's Arnold Engineering Development Center, Tullahoma, Tenn., was a project of demanding requirements. It took special skills of the highest order and a shop equipped with facilities for the heaviest work. That's why the job was given to Baldwin.

These four plates, 57 ft. x 8 ft., and .850 in. thick, form the flexible sides of a variable-type nozzle to control the air flow for any Mach number throughout the range of the design. The air-stream surface had to be machined to a thickness of $\pm .030$ in. tolerance. Transverse flatness had to be $\pm .031$ in. maximum, with variation gradual enough not to exceed .003 in. per in.; longitudinal flatness $\pm .019$ in., with variation from an 8-ft. straightedge not to exceed .001 in. per in.

The job included fabricating and machining the box girder floor and roof sections of the nozzle. In order to insure smooth and shockfree air flow during tests, the air-stream side of walls, roof and floor were given a 60 microinch surface finish. Tooling up necessitated fabricating a special strongback to support the plates rigidly during planing and grinding; constructing a special belt-grinder; and adapting a milling cutter for use on planers.

The next time you have a fabricating problem, call on the same minds and machines that mastered the challenge of this wind tunnel. For a copy of our illustrated Weldment Bulletin 7001, write to B-L-H Corporation, Philadelphia 42, Pa.



Boring mill attachment on a planer in the Eddystone Division rough cuts the outside surface of a flex plate for the wind tunnel, cuts planer clearance at the end shoulders, and machines the slip-joint grooves in the sliding shoulder.

BALDWIN · LIMA · HAMILTON
Eddystone Division

Philadelphia 42, Pa.

Hydraulic turbines • Weldments • Dump cars • Nonferrous castings





CF&I STEEL PRODUCTS...and

A few short years ago, visionaries were saying that "someday" airports would include hotels . . . and really efficient facilities for handling planes, passengers and the ground-bound vehicles which must serve both.

Yet "today" is now a reality in many American cities—thanks to skilled architects, designers, contractors and builders who combine ingenuity with practicality in designing airports, as well as schools, hospitals and many other types of buildings. It is this practicality that leads so many of them to specify CF&I Steel Products.

As each plane lands ①, for instance, it's usually just a few inches away from a very important CF&I Product. For **Clinton Welded Wire Road Fabric** is used in the runway so that it can withstand the terrific shock of

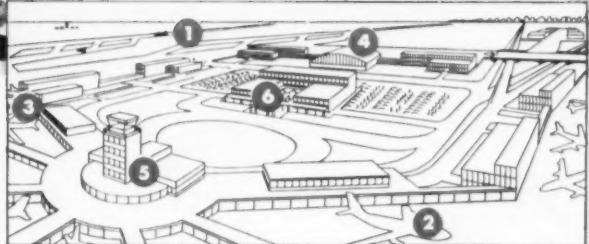
landing planes as well as the abuse of weather and time. What's more, CF&I Products helped build the runway. There were **CF&I Cutting Edges** on the giant bulldozers that carved out the runway site . . . **Wickwire Rope** on the draglines helped remove the surplus earth . . . and **CF&I Industrial Screens** were used to prepare the sand and gravel that went into the concrete.

In the plane itself ②, **Wickwire Aircraft Control Cable** operates wing and tail surfaces of the plane—just as **Wickwire Springs** and **CF&I Industrial Wire Cloth** play important parts elsewhere in the plane.

After the passengers deplane to an area protected by **CF&I Reunlock Fence** ③, the plane may be moved to a hanger ④. There other CF&I Products come into play.



today's airport



Some of the mechanic's tools, for example, are made from special **CF&I-Wickwire Wire** . . . and **Wickwire Wire Rope Slings** serve many purposes.

The passenger terminal building ⑤ is built of concrete—concrete that's reinforced with **CF&I's Clinton Welded Wire Building Fabric**.

This type of construction is also widely used in the airport hotel ⑥. And you'll find another CF&I Product

playing an indispensable part here, too. It's dependable **Wickwire Elevator Cable**.

Even if you don't build airports . . . or operate them . . . you can still use many of the long line of CF&I Products to excellent advantage right in your own operations. Contact your nearby CF&I Representative for complete details.

THE COLORADO FUEL AND IRON CORPORATION

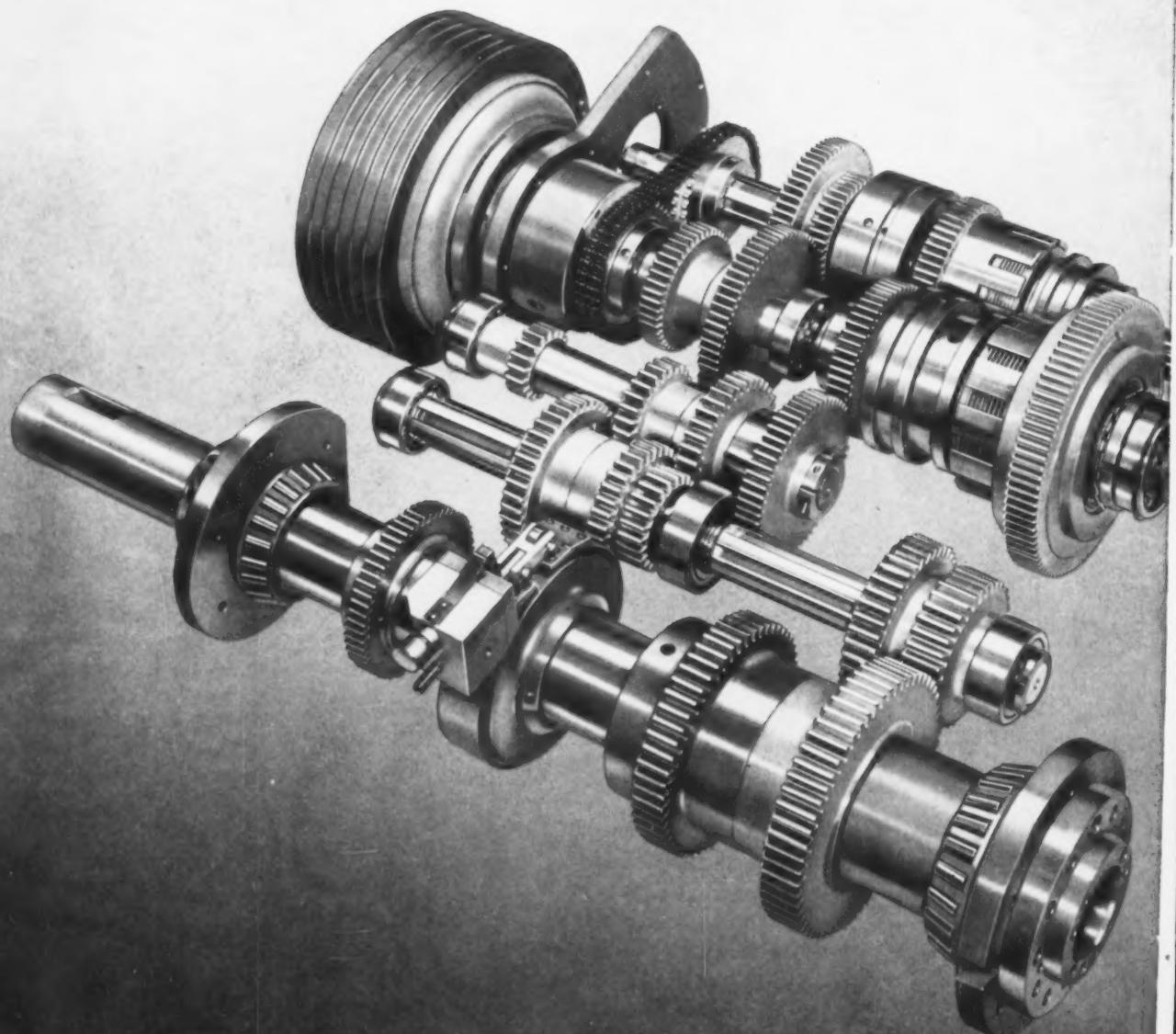
THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Casper • Denver • El Paso • Ft. Worth • Houston • Lincoln (Neb.) • Los Angeles • Oakland • Oklahoma City • Phoenix • Portland • Pueblo • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane • Wichita

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New GISHOLT MASTERLINE SADDLE TYPE TURRET LATHE

WANT MAXIMUM OUTPUT AND ACCURACY from today's carbide tools—with an ample reserve of power and speeds to meet tomorrow's tooling requirements?

That's what you'll get—*now*—from this powerful, rugged Gisholt MASTERLINE Saddle Type Turret Lathe. Prime example of this machine's advanced features is the rugged Headstock Gear Train, shown at the left. Here, you can get 24 different forward speeds—all from a *single-speed* motor. This means you get *full power all the time*—a critically important feature for those heavy cuts at punishing feeds.

But that's not all. To give you maximum performance from this powerful gear train, Gisholt designers have backed it with faster speed changes through the Hydraulic Speed Selector (effortless speed shifts without waiting or computing); a hydraulically operated Hi-Lo speed change in a 6:1 ratio (without stopping the spindle or shifting gears); and a new Self-Adjusting Electric Clutch and Brake (smooth, fast starting and stopping, plus more accurate inching of the spindle).

Ask your Gisholt Representative to give you the complete facts. Why not call him today?



ASK FOR complete
set of Gisholt
MASTERLINE
Saddle Type Turret
Lathe Bulletins.

GISHOLT
MACHINE COMPANY

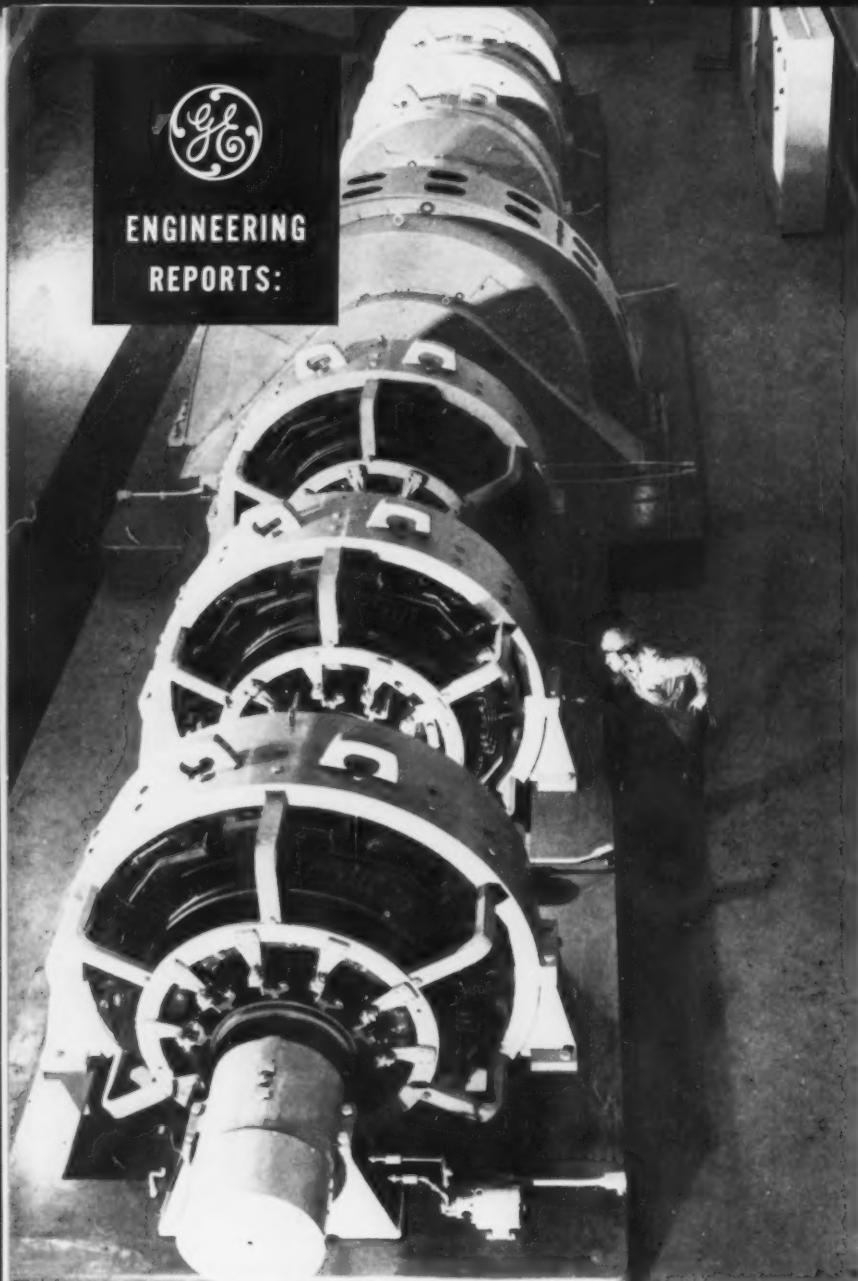


Madison 10, Wisconsin, U.S.A.

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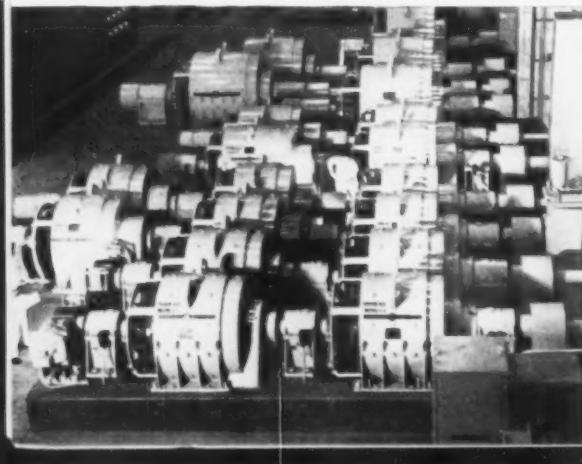


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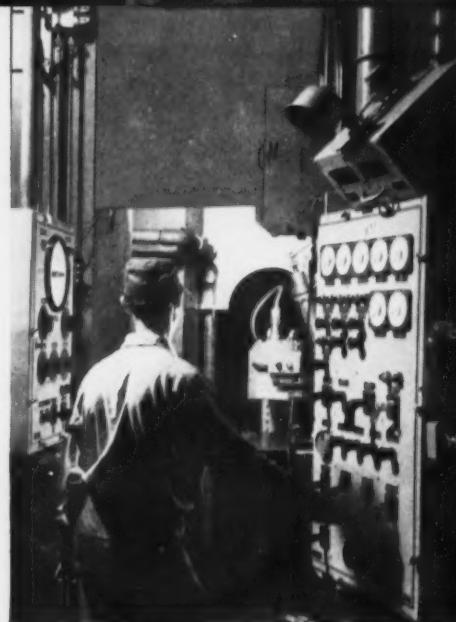


SUPPLYING POWER for stands 3 and 5, and tension reel, one of two huge G-E motor-generator sets has 15,000-hp synchronous motor and six duplicate 2000-kw generators.

FAST acceleration, balanced speed regulation are obtained using specially designed, low inertia, d-c drive motors, designed to fit mill's rigid space requirements.



ACCURATE system control is provided by main-drive d-c control equipment. Designed by G.E. for cold mills, panel includes memory fault finder, magnetic and rotating amplifier circuitry.

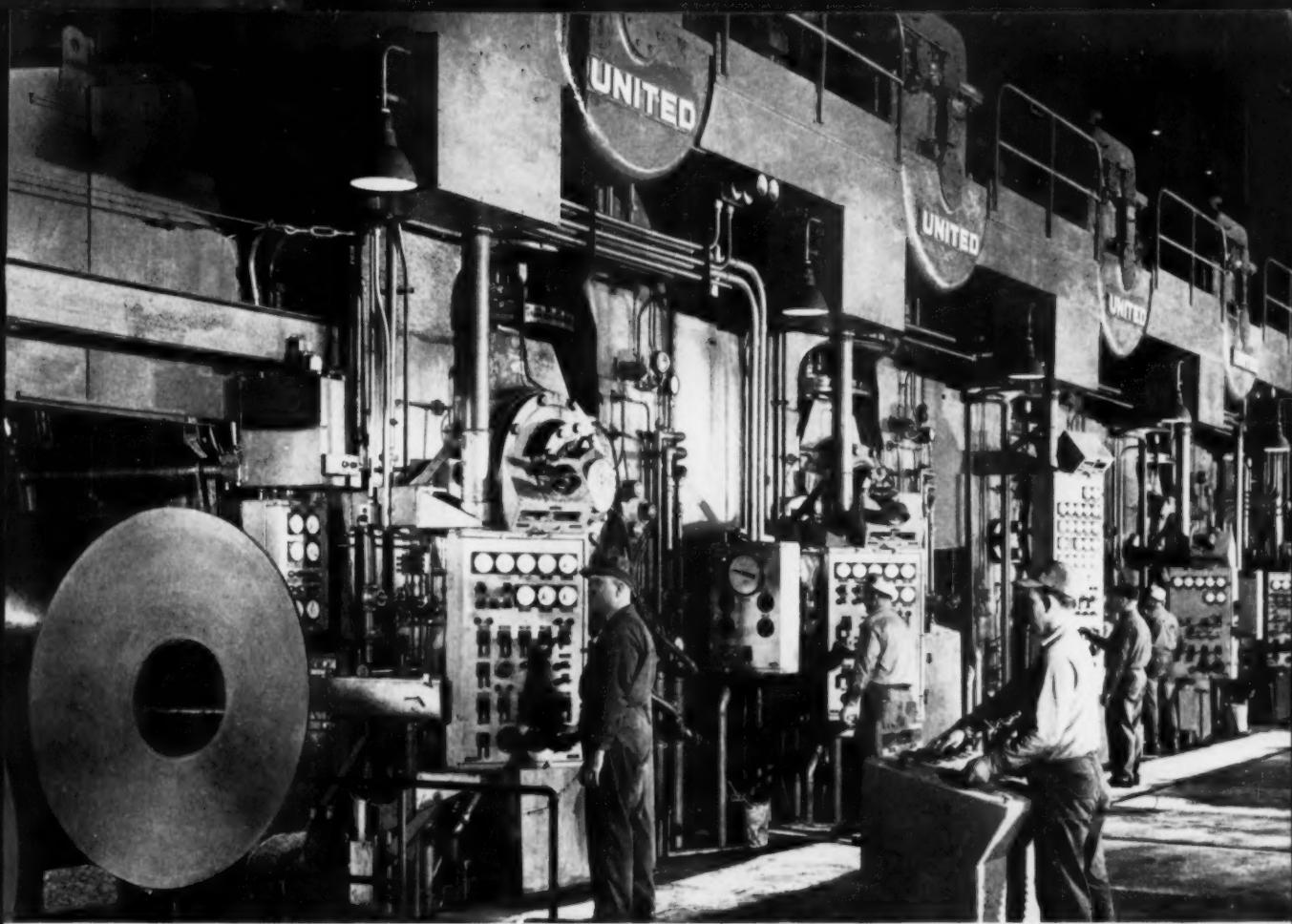


AUTOMATIC THICKNESS CONTROL system includes stand 1 X-ray indicator (left), X-ray gage (center). Operator's control cabinet is shown at right.



CLOSER TOLERANCES at higher speeds are obtained with thickness control system. Gage control panel shown above.





CHIEF OPERATOR'S control is located at stand 3, speed control at stand 5, on new 5-stand tandem cold strip mill.

At Weirton Steel: 28,000 hp Drives World's Most Powerful Cold Strip Mill

General Electric X-ray controlled cold mill drive system is world's fastest

National Steel Corporation's Division, Weirton Steel Company, Weirton, West Virginia, recently started up their new 5-stand tandem cold mill with a General Electric d-c drive system containing the world's greatest concentration of cold mill drive horsepower. With the new General Electric automatic X-ray gage control system, Weirton Steel Company's cold mill is another significant example of automatic production providing higher quality steel, with closer tolerances, at higher rolling speeds.

THE AUTOMATIC GAGE control system, one of the newest General Electric developments for the steel industry, has two basic elements: (1) a coarse regulating system to correct errors by means of the stand 1 screwdown motors, with the X-ray gage measuring stand 1 steel thickness; and (2) a vernier system controlling stand 5 drive motor speed, with the X-ray gage measuring finished strip thickness. Some of the highlights of the drive and control system are shown on these pages.

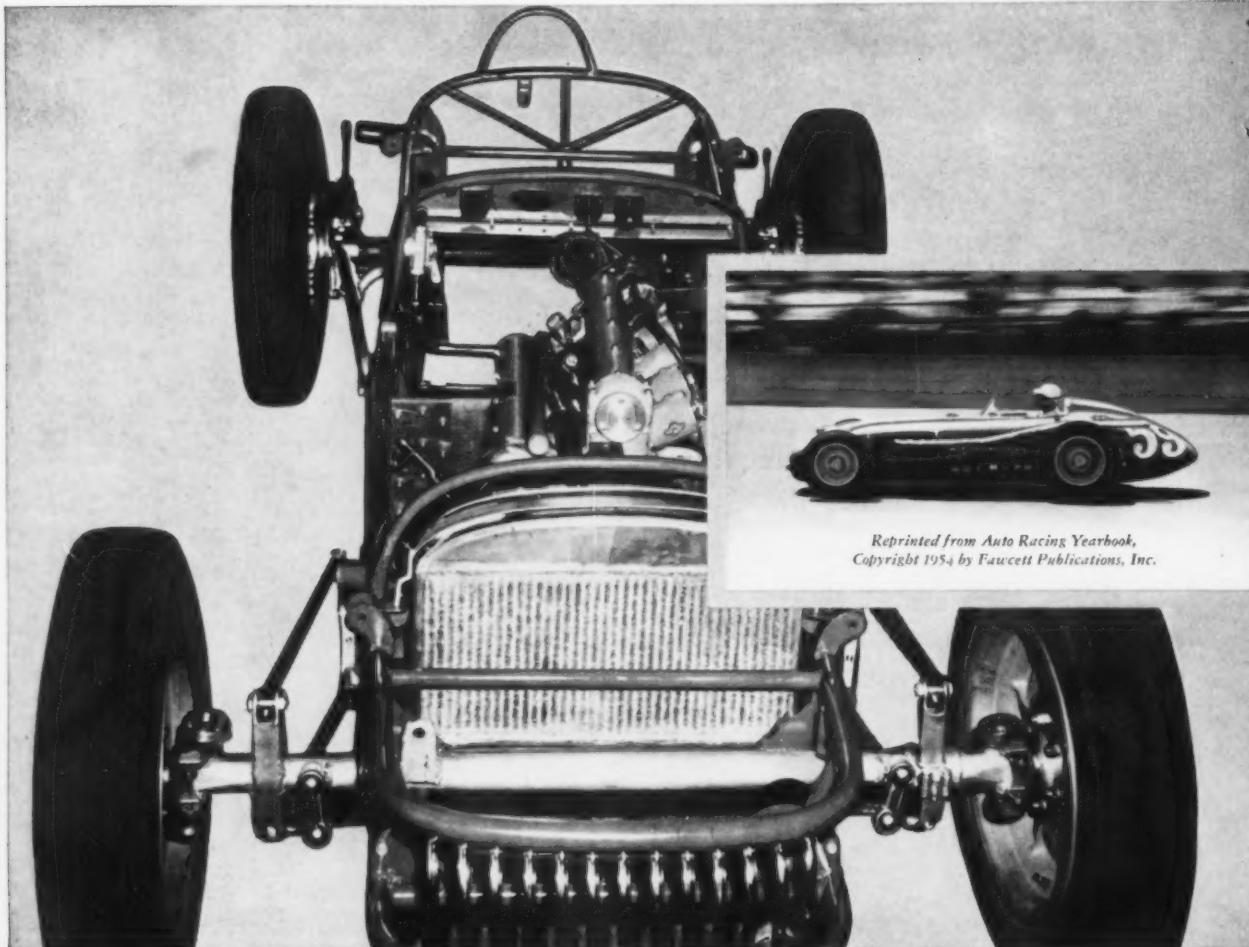
FROM INITIAL PLANNING, General Electric engineers worked closely with Weirton personnel and the United Engineering and Foundry Co. to help design, install and start up this engineered system that helps Weirton meet increased steel production requirements. Get complete information on the latest General Electric equipment and methods from your Apparatus Sales Representative at the nearest General Electric Apparatus Sales Office, early in your planning. 639-113

Engineered Electrical Systems for the Steel Industry

GENERAL  **ELECTRIC**

WHEN IT'S MOVING...MAKE IT TUBING

Pound for Pound, Tubular



*Reprinted from Auto Racing Yearbook,
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The body frame of this high-performance racing car is fabricated from steel tubing to obtain maximum strength at reduced weight.

REPUBLIC
World's Widest Range of Standard Steels

Construction is STRONGEST!

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STRONG RESISTANCE TO CORROSION, WEAR AND ABRASION make Republic Cold Finished Stainless Steel Bars ideal for this unique application. It's a testing tank for advance-type seaplane hulls. Testing is conducted by suspending hull model from carriage which rolls on Republic Stainless Steel Bars. Besides ease of maintenance, these bars provide higher tensile and yield strength, close tolerance, and a fine surface finish, permitting smooth, accurate operation of testing device. Republic metallurgists and engineers will help you apply stainless steel to your present and future work.



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Savings — Strain-Tempered Steels reduce your cost by elimination of lost production due to cracking and distortion caused by quench-and-temper heat treatments.



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PHOTO BY MC MANUS



Being interviewed is W. W. Smith, Divisional Manager, Product Engineering. Grids in back are of Exide's exclusive Silvium. Those in front are ordinary alloys.

"All of these alloys had the same acid test"

At the Exide Laboratories—**Reporter:** Was it a typical charge-discharge test normally used to test battery components?

Smith: Right. And the two positive plate grids with no visible signs of corrosion are Exide's patented Silvium alloy.

Reporter: How about the others—what alloys are they?

Smith: They're standard alloys used in other well-known makes of batteries. But they don't have Silvium's corrosion-resisting ingredients.

Reporter: Where is Silvium used?

Smith: In the positive plates of all Exide-Ironclad and many other Exide Batteries.

Reporter: How does it affect battery performance?

Smith: Every test we've made proves it stretches battery life because the grid resists corrosion—sometimes up to 100% longer.

Reporter: Obviously this is an important feature of the Exide-Ironclad.

Smith: Yes it is, but it's just one of many engineering details that contribute to its high capacity and long life.

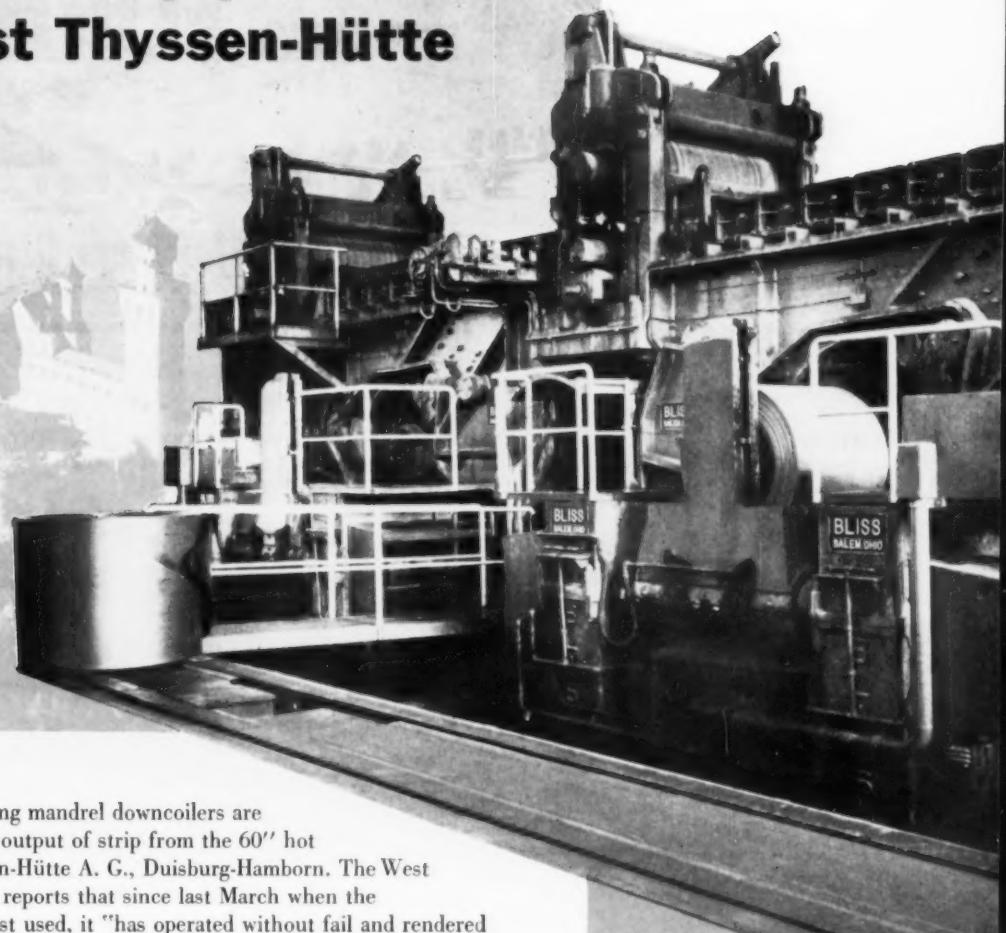
Note to battery users: Whenever you order heavy duty batteries or the equipment that requires them, be sure to specify Exide-Ironclad. For detailed bulletin, write Exide Industrial Division, The Electric Storage Battery Co., Philadelphia 2, Pa.



THE ELECTRIC STORAGE BATTERY COMPANY **Exide**®

In Germany:

two new Bliss downcoilers insure hot strip production at August Thyssen-Hütte



Two new Bliss expanding mandrel downcoilers are smoothly handling the output of strip from the 60" hot mills at August Thyssen-Hütte A. G., Duisburg-Hamborn. The West German steel company reports that since last March when the Bliss equipment was first used, it "has operated without fail and rendered good service in every respect."

User comments like this are the rule with Bliss downcoilers. The expanding mandrel design, originated by Bliss, provides a powerful, smooth-as-silk coiling action that winds tight coils with even edges. The blocker rolls touch the strip only when the initial wraps are made and the ends are being taken up. Thus, there is no scratching or surface damage during coiling.

You'll find Bliss equipment . . . and satisfied users . . . in rolling mills all over the world. To acquaint yourself with our products, why not write today for a copy of our 60-page Rolling Mill Brochure, Catalog 40-A? It's yours for the asking.

Bliss hot downcoilers at August Thyssen-Hütte coil strip in widths from 24" to 60". Mandrel diameter is 28", and maximum coil O.D. is 56". The two upenders were also designed and built by Bliss.

E. W. BLISS COMPANY

General Office: Canton, Ohio

ROLLING MILL DIVISION: SALEM, OHIO

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6

...and

good questions about aluminum FORMING

6

good answers

by Kaiser Aluminum Distributors

If you have a problem in forming aluminum, the chances are your *Kaiser Aluminum Distributor* can help you solve it. He has metal know-how and experience with many fabricating operations. Use his fund of technical knowledge, backed by the engineering ability of *Kaiser Aluminum's* field staff.

Here are the answers *Kaiser Aluminum Distributors* have given on specific forming questions asked by aluminum fabricators in various parts of the country. Questions such as these may also be bothering you.

Q. Is it possible to anneal aluminum between forming operations?

A. When aluminum has been cold-worked to the point that further work is not practical, it is then possible to partially anneal it before continuing the forming. With aluminum, annealing must be carefully controlled in order to assure adequate workability. It is suggested that we help you work out a fabrication procedure during your planning stage.

Q. Is tooling for aluminum the same as for steel products?

A. Tools for aluminum must be of better quality than those normally used for steel products. Hardened steel should be used wherever possible in dies and on the tool surfaces that form aluminum. Cast iron tools are not recommended because of surface voids into which the aluminum can be forced, with probable "pick-up" and scratches resulting. A mirror finish on tool surfaces is recommended.

Q. What lubricant would you recommend for light forming operations?

A. For simple operations, where heavy pressures are not involved, there are a variety of soluble mineral oils that can be used. Frequently dry cake paraffin is successful. Keep in mind that mineral oils do not have sufficient slip or lubricity where heavy pressures are necessary. Vegetable oils or tallows are required.

Q. What clearance between punch and die should I use to shear aluminum cleanly with minimum burr?

A. For aluminum in the soft condition, of normal thicknesses (.010 to .060), use a clearance of 10 per cent of the thickness of the metal. For hard tempers or heat-treated alloys this clearance can be increased to 12 or 13 per cent. In shearing light gauge (foil to .010) clearance may vary from 0 to 8 per cent depending on the thickness and temper of the metal.

Q. When bending or drawing aluminum how can I determine the amount of cold work the metal can take?

A. You will find tables in aluminum handbooks showing the minimum radius allowable for making 90° bends for various alloys. (See page 38, *Kaiser Aluminum Forming and Bending Handbook*.) As the alloy, temper or gauge changes, so does the amount of cold work that can be absorbed by the metal without fracture. The higher the initial elongation, the greater the ultimate deformation. (For draw reductions, refer to pp. 21 & 22 of *Kaiser Aluminum Forming and Bending Handbook*.)

Q. We've found that aluminum under pressure tends to seize to the die surfaces. How can we correct this?

A. Construct the die surfaces of hardened tool steel with a high polish. Also, use a lubricant that has sufficient body and slip to prevent scoring or scratching the product.

* * *

**For the right answer, ask your
Kaiser Aluminum Distributor**

Kaiser Aluminum Distributors have helped hundreds of fabricators find the answers to difficult problems. Whether it's selecting the right material for a particular job, suggesting more economical methods of operation, or solving complicated production problems, your *Kaiser Aluminum Distributor* is ready to give you instant assistance.

For useful up-to-date forming information send for *Kaiser Aluminum's Forming and Bending Handbook*. Simply send your request on your letterhead to *Kaiser Aluminum & Chemical Sales, Inc., Industrial Service Division, Dept. FB, Palmolive Bldg., Chicago 11, Illinois*. Your *Forming and Bending Handbook* will be sent to you immediately free of charge.

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See "THE KAISER ALUMINUM HOUR." Alternate Tuesdays, NBC Network. Consult your local TV listing.

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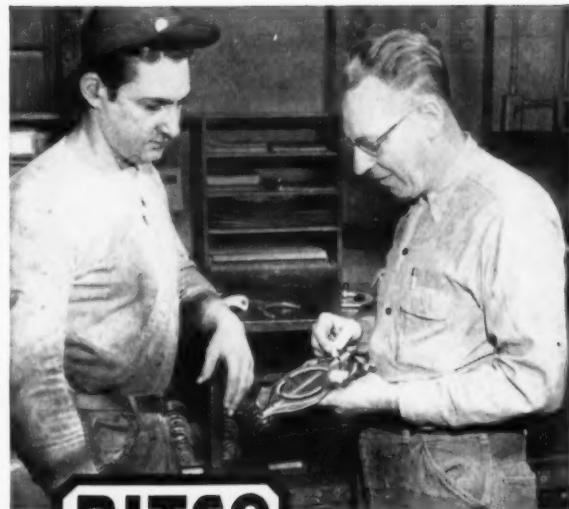
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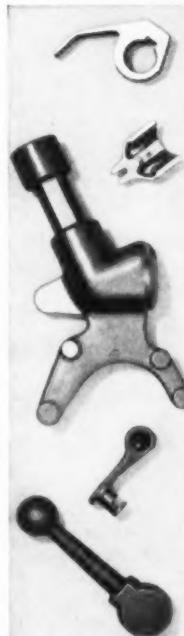
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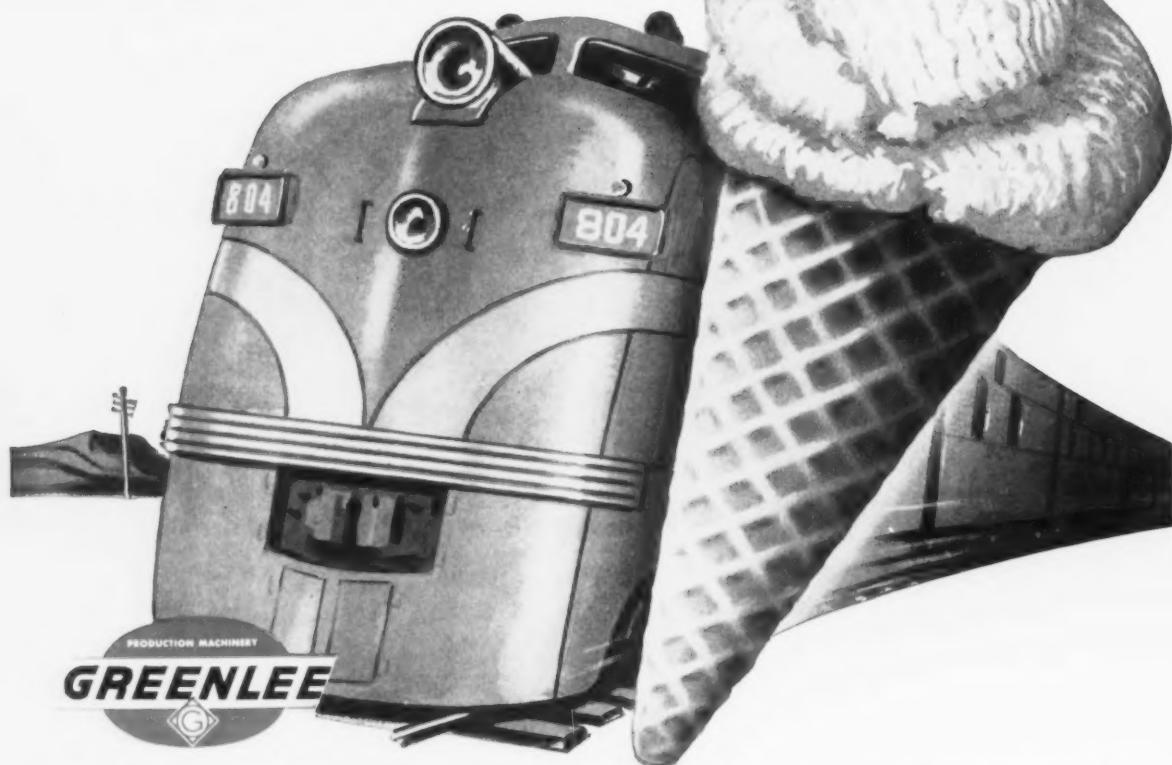
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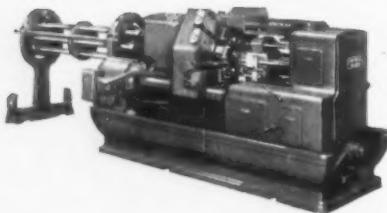
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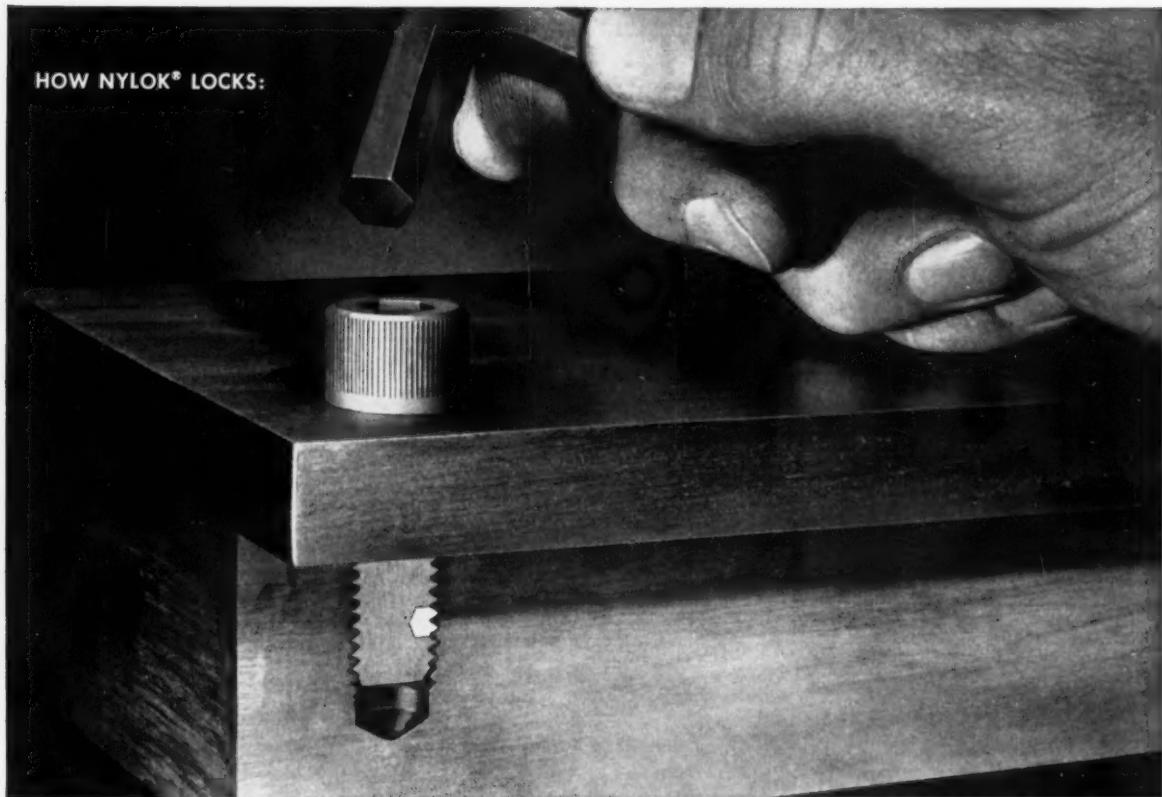
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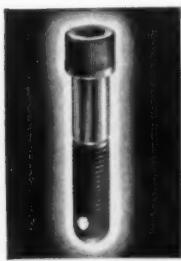
You save production time when you build products with self-locking UNBRAKOS. And you get greater simplicity in design with less bulk and weight. The number of parts you must assemble to achieve full locking action is reduced to the absolute minimum. Lockwashers under screw heads are no longer necessary. Costly wiring of cross drilled heads is eliminated. So are cotter pins and complex multiple set screw installations.

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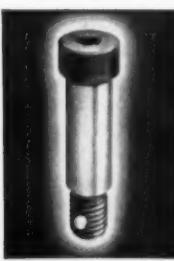
Self-locking UNBRAKO socket screws come in a complete range of standard sizes and materials. See your authorized industrial distributor. Technical data and specifications are detailed in Bulletin 2193. Write us for your copy today. Unbrako Socket Screw Division, STANDARD PRESSED STEEL CO., Jenkintown 17, Pa.

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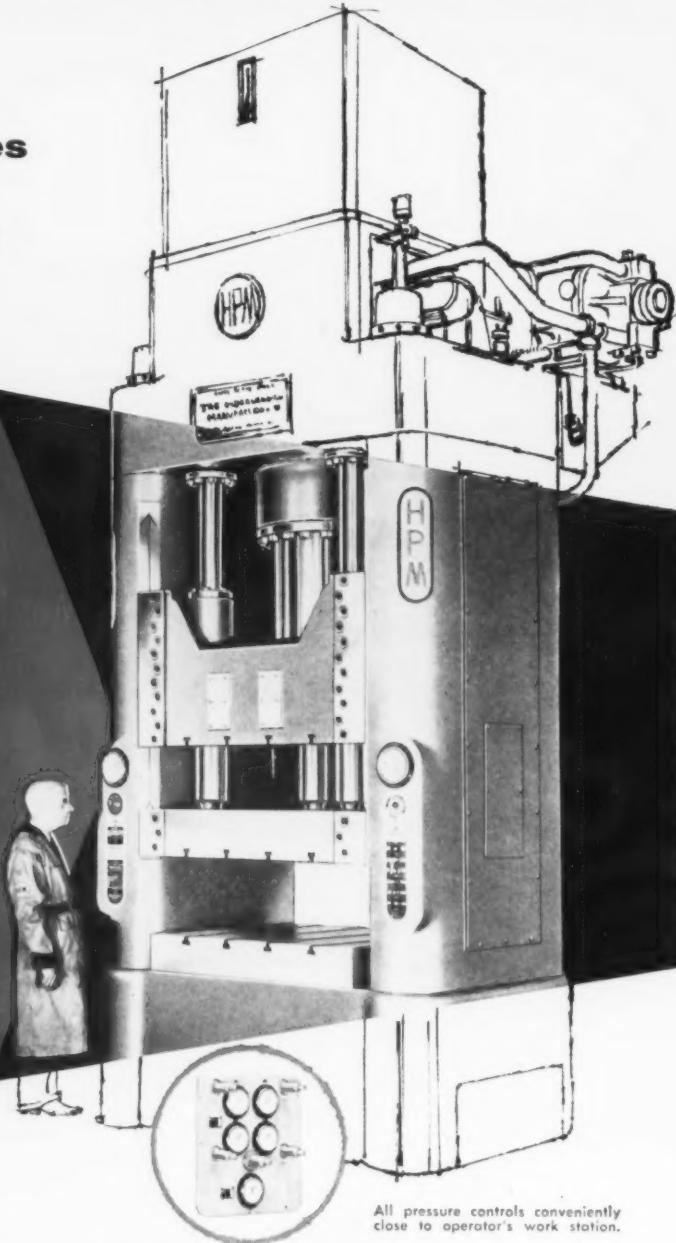
blankholder locks to face of main slide. Only main ram operates. Die cushion is idle.

For Deep Drawing Jobs

blankholder is locked to face of main slide. Main ram and die cushion operate. Die cushion used as lift-out with delayed action on return stroke.

For Deep Drawing Jobs

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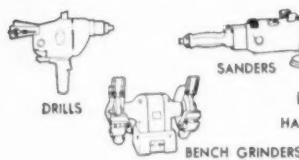
POWER-BUILT Black & Decker Scruguns® drive with precision from finger-lightness to wrench-tightness!

When you team up B&D Scruguns and Power-Speed Control, work goes faster because you choose the correct speed and tension for every assembly job. And you have fewer rejects because this unique combination prevents burring screw heads, stripping threads, shearing screws and marring surfaces.

The compact, lightweight B&D Power-Speed Control is completely portable, easily mounted. Its

calibrated precision dial gives instantaneous change of torque and speed. It handles as many as three B&D adjustable clutch Scruguns.

Whatever your application, or the type of driver you are now using, ask your B&D distributor for a demonstration of this precise control—impossible with other power drivers! Or write for free catalog No. 10 to: THE BLACK & DECKER MFG. CO., Dept. 7802, Towson 4, Md. (In Canada: 80-86 Fleet St., E., Toronto 2, Ontario.)



Look Under
"TOOLS-ELECTRIC"
in Yellow Pages



Leading Distributors Everywhere Sell

Black & Decker®

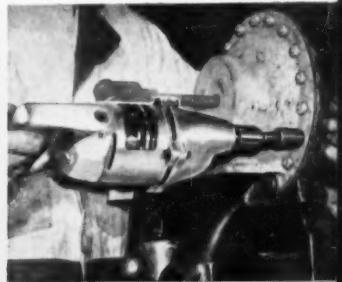
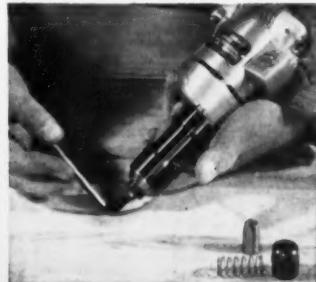
Portable Electric Tools—Power-Built to Last

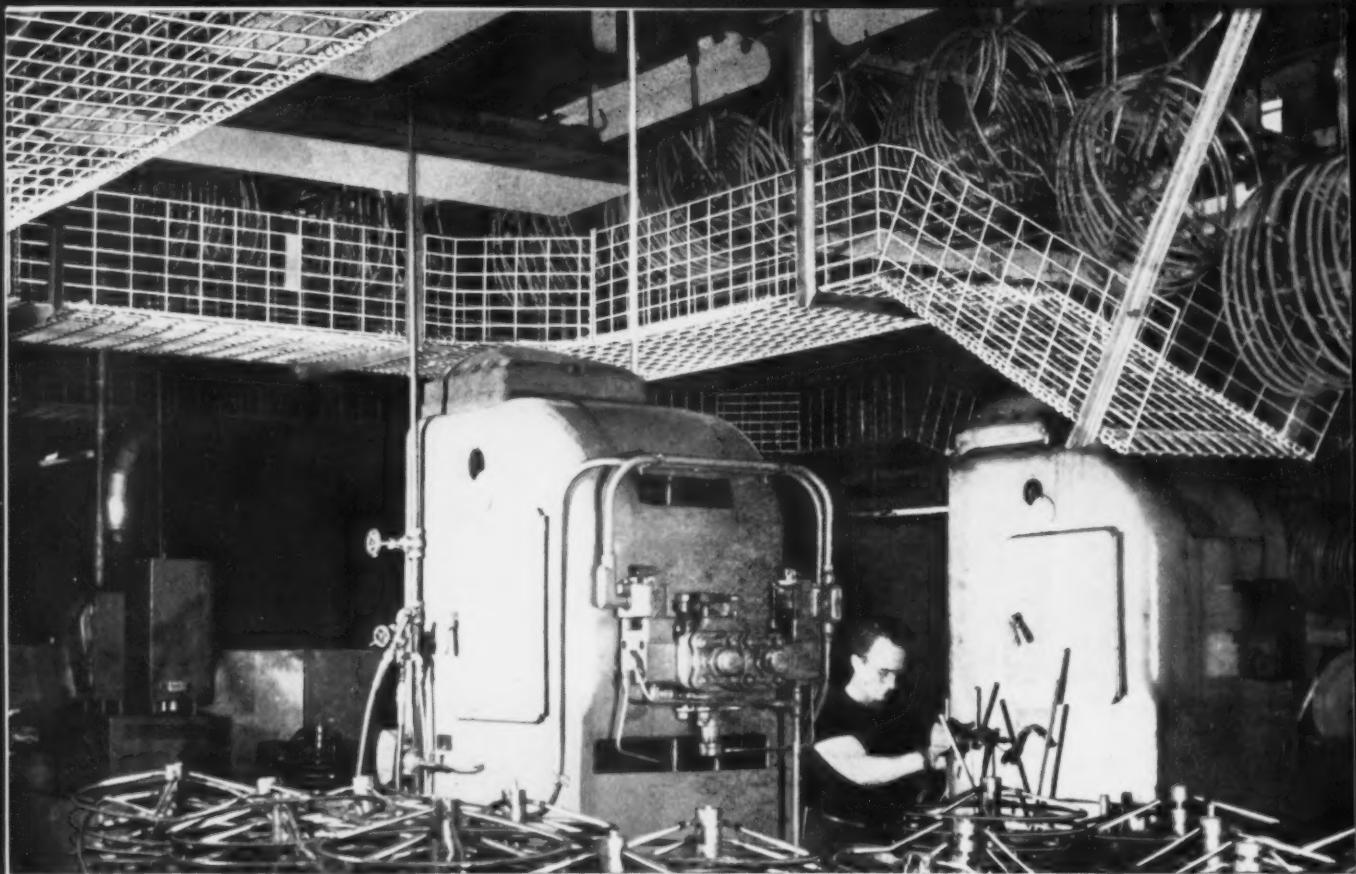
POWER-BUILT BY B&D, every Scrugun motor is tailor-made in our own plant for the tool it drives, for peak performance and longer service.

CHOICE OF 3 CLUTCHES, positive, single adjustable and double adjustable. Simple external adjustments stay put. No creeping of bit or socket.

EASY HANDLING B&D Scruguns are lightweight, compact, perfectly balanced. New piggy-back reversing switch is located for fast, easy control.

56 SCREW DRIVER MODELS give you the proper design and speed for every application. Choose from three switch controls—trigger, toggle and paddle.





Pittsburgh Steel Conveyor Guard in this midwestern auto parts plant was installed faster and easier than alternate systems.

New Use For Wire Mesh—Conveyor Guard Cuts Costs In Auto Parts Plant

**Pittsburgh Steel Products Engineers Design
Guard Which Goes Up Faster, Easier**

Pittsburgh Steel wire mesh Conveyor Guard is marking up substantial savings for a giant Ohio auto parts manufacturer.

Conveyor Guard, a new product of Pittsburgh Steel Products, a division of Pittsburgh Steel Co., is proving in actual use that it has these money-saving advantages.

1. **It goes up faster and easier.**
2. **Regular maintenance crews can remove and relocate Conveyor Guard quickly without damage.**
3. **Cost of installation and relocation is slashed.**
4. **Conveyor Guard collects less dirt and retains its pleasing appearance.**
5. **The need for lateral framing is eliminated.**

6. Conveyor Guard is supported on 8-foot centers instead of conventional 4 or 5-foot centers necessary with other materials.

The huge 28-building plant uses its extensive overhead conveyor systems as a ready-made storage bank for materials and parts to save floor space and keep supplies close at hand.

On the steering wheel line, for example, heavy steel steering wheel inserts shown in the photographs pass into the building on an overhead conveyor, move up one side of a long building and then pass down the production line for plastic molding and other operations.

Since these overhead conveyors customarily carry many more inserts than are needed to keep production

running smoothly, they must move a tremendous load high above heads of workers below. Adequate protection is a must. Pittsburgh Conveyor Guards provide the needed protection without requiring maintenance.

• Passes All Tests—Working from blueprints of a new steering wheel line conveyor system, Pittsburgh Steel Products' engineers designed a guard which passed all the tests of the customer's materials handling engineers and plant layout men. Now, day after day, Pittsburgh Conveyor Guard is proving itself on the job.

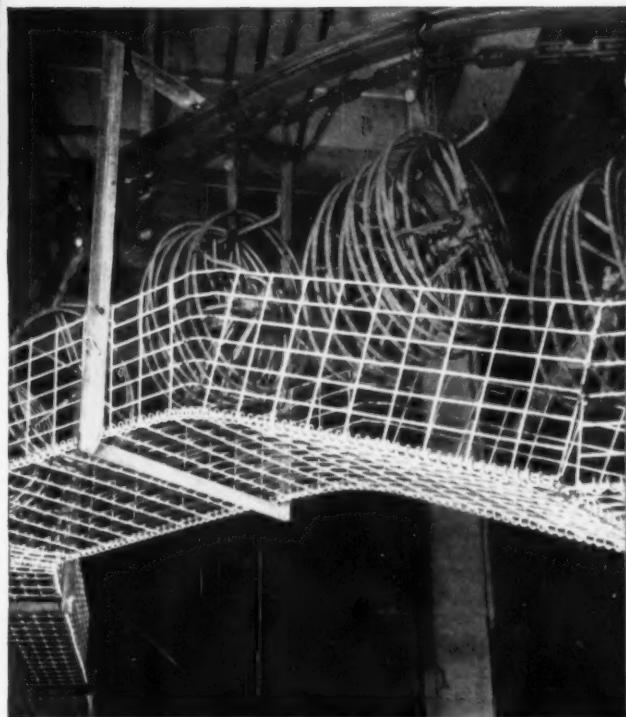
About 570 linear feet of Conveyor Guard were used in the first installation. It consisted of No. 2 gage steel wire welded into a 2 x 4-inch mesh and supplied in standard 8-foot



Three big advantages of Pittsburgh Steel Conveyor Guard are pictured here. 1. Fastening is secure, quick and simple. 2. Rises are made by bending the wire mesh on the job. 3. Each 8-foot long section is helixed to the next section in final position.



One twist with a pair of pliers and the wire clip is securely and permanently fastened.



Neat, pleasing appearance of Pittsburgh Steel Conveyor Guard is an added bonus. Less dirt collects on wire mesh.

lengths. The mesh is 2 or 4 feet wide, depending on whether it is designed to safeguard one or two conveyor lines.

Each 8-foot length is helixed on both sides to an 8-foot long piece of mesh one foot wide. These foot-wide sections are installed at right angles to the wide sections to provide the side walls of conveyor guards.

Installation is quick and easy with simple tools. The guard rests on angle irons measuring $1\frac{1}{2} \times 1\frac{1}{2} \times \frac{3}{16}$ inches. Each section of Conveyor Guard is helixed to the section ahead of and behind it and the wire mesh is curved right on the job when a rise is necessary.

Right angle turns are made by cutting sections to fit. In some situations, sections are welded instead of helixed together. These corner sections can be made on the spot or can be purchased custom-made from Pittsburgh Steel Products.

• **Custom-made Corners**—The auto parts manufacturer first bought corner sections from Pittsburgh Steel Products but later made them in his own plant from standard 8-foot long sections when he found this fabrication was a simple operation his own

men could do rapidly.

At a rise, a section of mesh is bent up to the right position and welded or helixed to the end of the next section. Pieces can be cut from a section if necessary to make a fit, or filled out with odd pieces of fabric.

Welding this mesh offers no problems. Strong welds are made easily in minutes.

Wire mesh Conveyor Guard is fastened to supporting angles with a special clip designed and supplied by Pittsburgh Steel Products (see photo).

• **Made Good On Job**—After a try-out period on the steering wheel line,

company executives predicted further use of the new type Conveyor Guard on future installations.

You can benefit from these same advantages for real economies. Here's the answer to materials handling problems that arise from outmoded, high-cost conveyor guards. Call or write the nearest Pittsburgh Steel Products sales office listed below to get the help of a representative trained in materials handling.

Whether you're installing a new conveyor, extending your present system or relocating an existing conveyor, you'll save by getting in touch with a Pittsburgh Steel Products man. Call him today.

Pittsburgh Steel Products

a division of Pittsburgh Steel Company

Grant Building

Pittsburgh 30, Pa.



District Sales Offices

Atlanta
Chicago
Cleveland

Columbus
Dallas
Dayton

Detroit
Houston
Los Angeles

New York
Philadelphia
Pittsburgh
Tulsa
Warren, Ohio



DRAVO-LURGI sinter plants convert iron ore fines to usable form

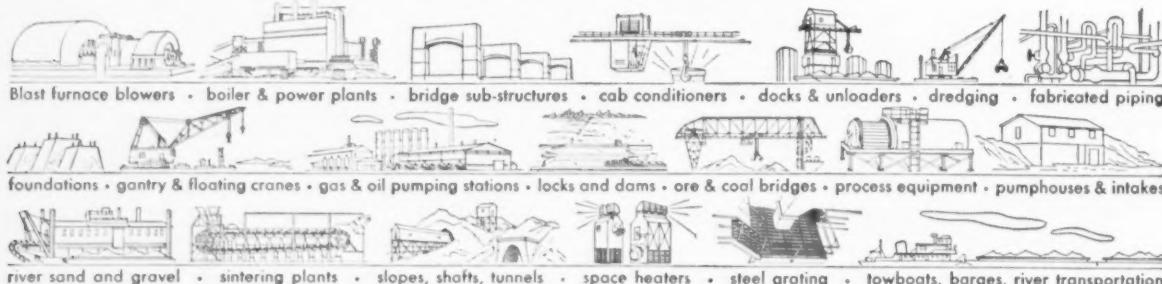
Two new sinter plants, with a combined annual capacity of over 10,000,000 tons, are being built by Dravo. Each plant will contain three huge sinter machines for processing iron ore fines into clinkers suitable for charging blast furnaces.

Through an exclusive licensing agreement with the Lurgi Company, Europe's foremost builder of sinter machines, Dravo Corporation's extensive engineering and construc-

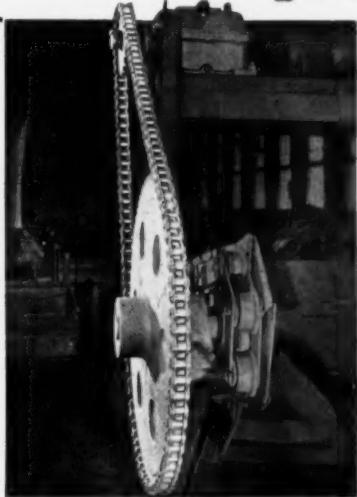
tion facilities are combined with Lurgi's design experience. The new plants now under construction are a result of this combination.

Dravo's engineering and construction skills play an important part in making new processes and techniques available to industry. For information on any of the products or services listed below, write DRAVO CORPORATION, PITTSBURGH 22, PENNSYLVANIA.

DRAVO
CORPORATION

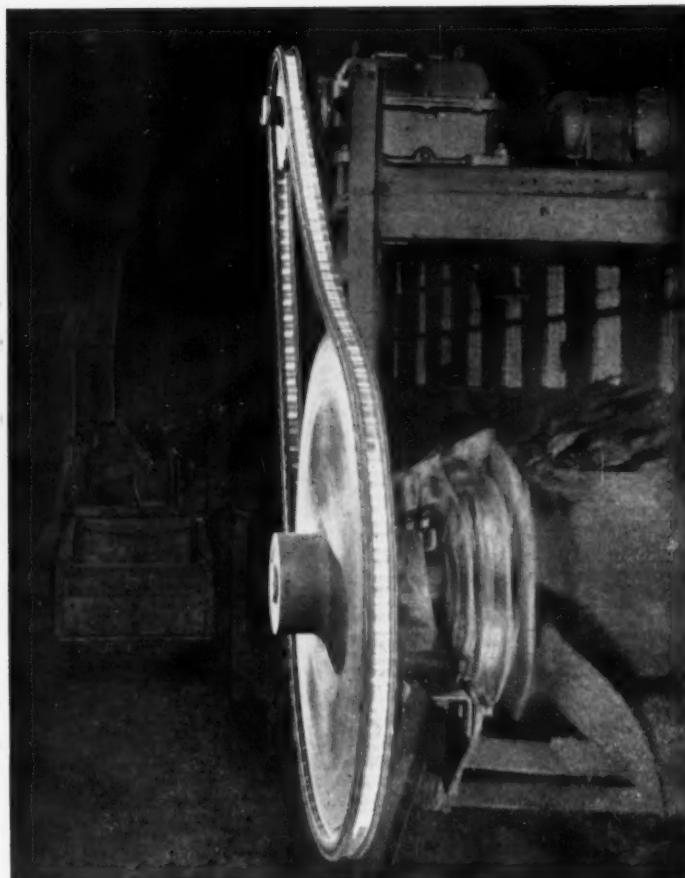


To static strength...



RESISTANCE TO TENSILE STRESS is achieved by use of properly heat-treated, accurately-machined sidebars made of premium steel and fitted with properly-hardened pins, bushings and rollers. But to resist *operational* stresses, additional controls over accuracy, uniformity and roller resiliency are essential.

STRENGTH OF CHAIN IN MOTION is accomplished through tensile strength *plus* special Link-Belt refinements. These include pitch-hole preparation, micro-finish of parts, special processing of sidebars, pre-lubrication and rigid quality control from initial selection of materials to final protective boxing.



LINK-BELT adds great dynamic strength

that gives Precision Steel Roller Chain on-the-job endurance

WHEN selecting roller chain for your drive or conveying job, durability under actual working conditions is what you're after. That's *dynamic strength*—and it's built into *every length* of Link-Belt Precision Steel Roller Chain. From it comes resistance to such operating stresses as engagement with sprockets, shock of starting loads, centrifugal loads and others.

No one feature can establish high dynamic strength. It results from a combination of Link-Belt "extras" . . . plus other special methods of design, manufacturing and processing. On the job, it means extended life, positive action, less maintenance.

Ask your Link-Belt office or authorized stock-carrying

distributor for Book 2457, covering single and multiple width roller chain and sprockets in $\frac{1}{4}$ to 3-inch pitch . . . and in double pitch, 1 to 3-inch.

LINK-BELT

ROLLER CHAIN & SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarborough (Toronto 14); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.

14-123

LINK-BELT gives you dynamic strength that comes from these important EXTRAS



PRE-STRESSING of multiple width chain provides uniform load distribution.



SHOT-PEENED rollers have greater fatigue life, added ability to withstand impact.



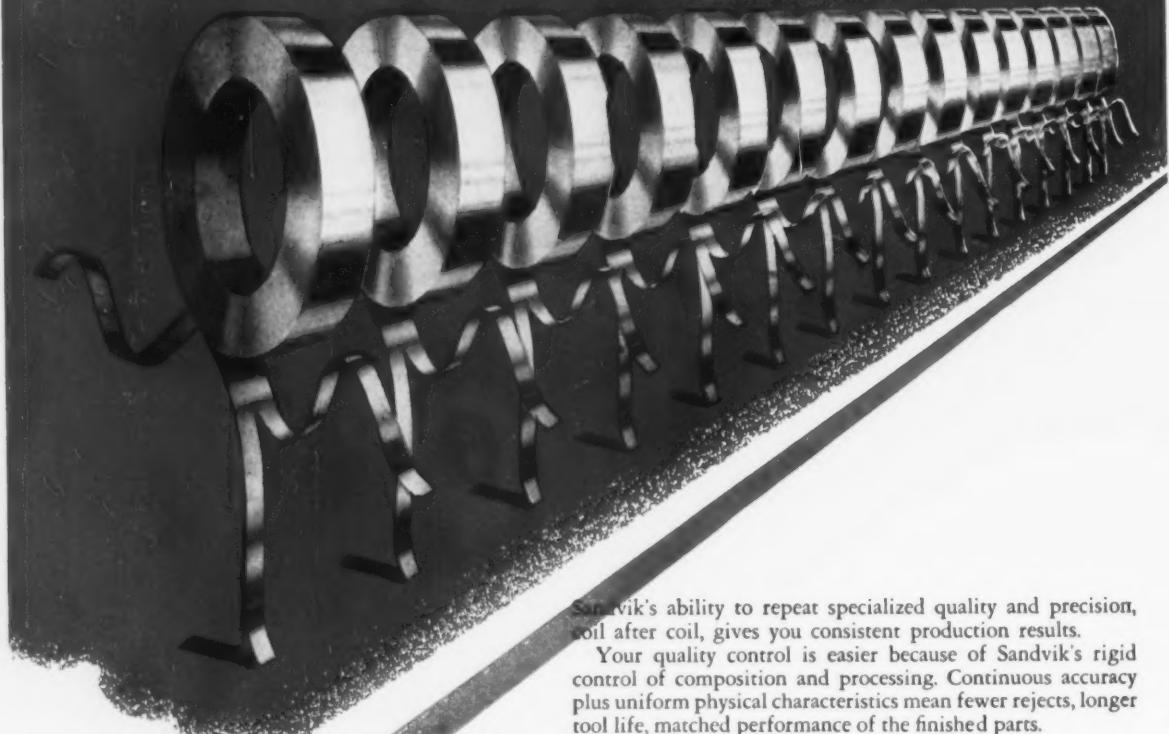
CLOSE HEAT-TREAT CONTROL — coupled with rigid testing insures uniformity.



LOCK-TYPE BUSHINGS (applied on a range of sizes) end a cause of stiff chain.

Sandvik Spring Steel's *Matched Performance*

gives you continuous quality production



Sandvik Swedish Specialty Strip Steels are used for Textile Machine Parts such as sinkers, needles, etc. • Band Saws (metal, wood and butcher) • Camera Shutters • Clock and Watch Springs • Compressor Valves • Doctor Blades • Feeler Gauges • Knives such as cigarette knives, surgical instruments, etc. • Razor Blades • Reeds • Shock Absorbers • A Wide Variety of Springs • Trowels • Vibrator Reeds • Piston Ring Segment and Expanders, etc.

SANDVIK HIGH QUALITY SWEDISH MAGNET IRON STRIP AND WIRE FOR SPECIALIZED ELECTRICAL PURPOSES — Direct Current Relays, Electro magnetic Brakes, Couplings, Chucks, etc.

Sandvik unalloyed magnet iron has superior magnetic properties — low coercive force, high permeability and good stability after aging. It has excellent bending capacity which eliminates intermediate annealing.

Available in cold rolled strip in thicknesses from .0008" to approximately .197, in widths up to approximately 8". In exceptional cases widths up to 11-13/16" can be supplied. Available in drawn wire up to 19/32" diameter. Contact Sandvik for further details.

Sandvik's ability to repeat specialized quality and precision, coil after coil, gives you consistent production results.

Your quality control is easier because of Sandvik's rigid control of composition and processing. Continuous accuracy plus uniform physical characteristics mean fewer rejects, longer tool life, matched performance of the finished parts.

Sandvik Swedish specialty cold rolled high carbon strip steels are available:

- In special analyses for specific applications.
- Precision-rolled in thicknesses to fit your requirements.
- In straight carbon and alloy grades.
- Annealed, unannealed or hardened and tempered.
- Polished bright, yellow or blue.
- With square, round or dressed edges.
- Wide range of sizes in stock—also slitting facilities available.

Ask your nearest Sandvik office for further information or technical assistance.

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Works: Sandviken & Hellefors, Sweden.



\$5.95



...lets one man handle work you'd pay a crew to do!

By putting new efficiency, safety and positive control into the hands of Towmotor lift truck operators you enable them to do a *bigger day's work, easier*. You let each one handle jobs you'd normally hire a *gang* to do.

Through modern Towmotor mass-handling each operator has the power to improve your profit picture, because the new Towmotor fork lift trucks multiply their productivity. Look over the new features that operators like best about our latest models—such as:

- New planned-comfort design
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- "3-second access" to engine
- Famed 12" reach for all controls

**Leaders for 38 years in
building Fork Lift Trucks,
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Before you decide on your next fork lift truck, we urge you to get all the facts on the newly-designed Towmotor units. Write to Towmotor Corporation, Cleveland 10, Ohio today and ask for our new illustrated lift truck booklet—No. SP-23.

TOWMOTOR *-GERLINGER*
THE ONE-MAN GANG

Gerlinger Carrier Company, Dallas, Oregon, is a subsidiary of Towmotor Corporation

Backbone of a Hundred Industries... NATIONAL SEAMLESS



Crunching over the frozen Arctic in a tremendous cargo carrier is a far cry from fracturing the formation of a deep well in Texas. Yet, there is a definite link between them—NATIONAL Seamless, which makes them both possible. The versatility of NATIONAL Seamless Pipe and Tubes is almost unlimited because NATIONAL Seamless possesses all the fundamental *good* qualities which are so needed in so many industrial applications.

NATIONAL Seamless combines to the highest degree such vital qualities as strength, safety and workability. Uniform throughout and dimensionally accurate, NATIONAL Seamless Pipe and Tubes promise smooth installation and long satisfactory service. Available in a complete range of steel analyses, wall thicknesses and diameters, every foot is produced to exacting standards by the world's largest manufacturer of tubular steel products.

Bring your pipe and tubing problems to National Tube. Our engineers will be happy to provide any help they can.

1. This 252-mile gas line from Hebron, Pa., to Greenwich, Conn., was the world's first installation of National *Expanded Seamless* Line Pipe, a new product of National Tube. The 24-inch diameter pipe is easier to weld at all temperatures, yet possesses greater strength and uniformity than ordinary line pipe.

2. The *LeTourneau Sno-Freighter* is a giant, six-section, 125-ton capacity cargo carrier, designed to travel over ice, snow, bulldozed trails, or rough brush land. All of the car frames and coupling mechanisms were constructed from National's *Shelby Seamless Mechanical Tubing*.

3. 13,000 feet of National Seamless Deep Well Casing were used to fracture the formation of this non-producing oil well. Thousands of gallons of crude oil, sand, and flush oil were pumped down the hole at pressures up to 6,000 psi. In two days the well became a good producer. National Seamless Casing has the high collapse resistance and strength to withstand the intense pressures of just such jobs as this.

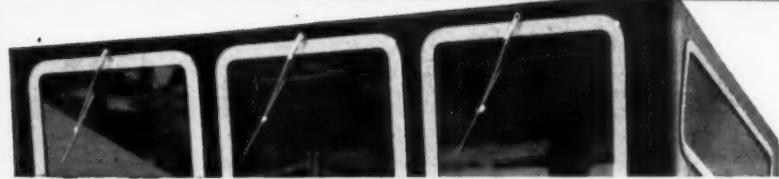
4. National Seamless *Tubular Steel Piles* provide low-cost support for heavy building loads. Their circular shape gives them outstanding strength, and, being hollow, they can be filled with concrete for greater loading capacity. They provide ideal foundations for roads, bridges and buildings.

5. *Marine Pipes and Tubes* of National Seamless offer the greatest possible security as marine steam lines—bear up under high temperatures and intense pressures, year after year. National Seamless is strong, tough, uniform—has every qualification for any marine power piping system, small or large.

6. The National Seamless Method of manufacture is one of the most difficult forging operations in the steel industry. A billet of the finest steel is actually pierced to produce a seamless tube with absolutely uniform wall strength. No welds . . . no joints . . . no weaknesses.

SEE The United States Steel Hour. Televised alternate weeks. Consult your local newspaper for time and station.

UNITED STATES STEEL



PIPE AND TUBES

Alaska FREIGHT LINES INC.

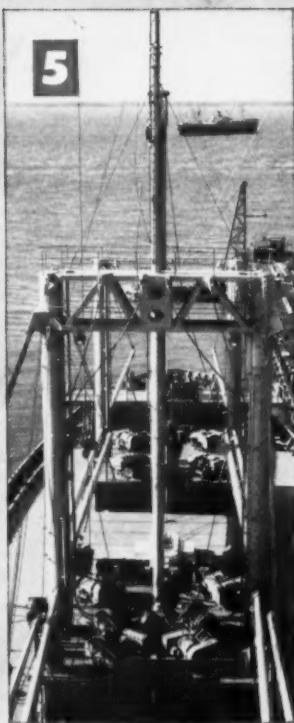
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3



5



4



6



NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

NATIONAL SEAMLESS PIPE AND TUBES

UNITED STATES STEEL





"Bill, why are you so sure Dow perchloroethylene will do a better job in my degreaser?"

"One big reason, Jess. Dow Perchloroethylene Industrial is tops in *stability*. Its resistance to breakdown and deterioration is as good as you can get."

"So what does it do for me?"

"Plenty. Cleans parts thoroughly the first time through. Eliminates rejects and reruns. Prevents damage to your degreaser and the parts—especially white metal parts."

"Think it'll remove that wax?"

"Sure will. Its higher boiling point gives parts a longer, more thorough cleaning before reaching the vapor temperature. It's real tough on those higher melting waxes."

"O.K., Bill, so it'll really clean. But is it safe?"

"You bet! No flash point and no fire point."

"All right. I'm convinced it's the best solvent for the job. Say, you sure know a lot about it."

"Not really. Dow people know more."

"Who?"

"Dow. The Dow Chemical Company, Midland, Michigan. The company that also makes Dow Trichloroethylene for vapor degreasing, Chlorothene® for cold cleaning, and Dow Methylene Chloride for stripping. Why don't you drop them a line?"

YOU CAN DEPEND ON



solves headaches 3 ways

"The finished product is no better than its components. Harvey forgings assure top quality...best performance...better sales."

"A purchase order for Harvey forgings assures prompt delivery, top quality, and the best competitive price."

"Advanced design and engineering demand precision... Harvey forgings fulfill the most demanding specifications."



HAND FORGINGS...PRESS FORGINGS...NO-DRAFT FORGINGS...
ALL ALLOYS...IN ALUMINUM OR TITANIUM

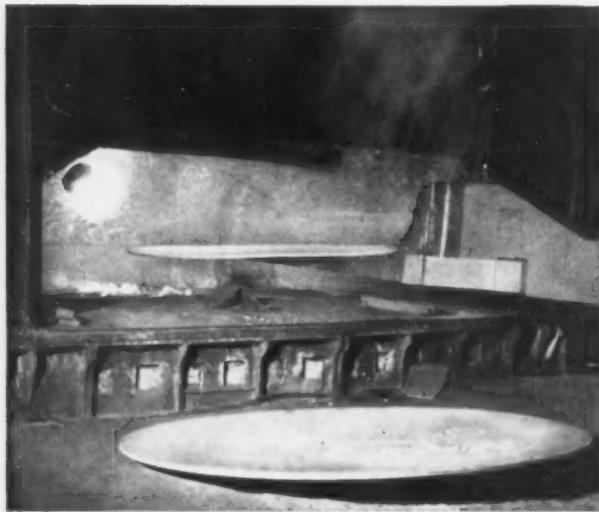
MAKING THE MOST OF ALUMINUM...FOR EVERYONE
HARVEY ALUMINUM SALES INC., TORRANCE, CALIFORNIA

HARVEY
Aluminum

Harvey is a leading independent producer of quality aluminum products in all alloys and sizes: Rod and bar, pipe, tube, hollow sections, press forgings, forging stock, impact extrusions, structural, special shapes, extrusions, screw machine products and other aluminum products. Harvey is also producing similar items in titanium and steel.

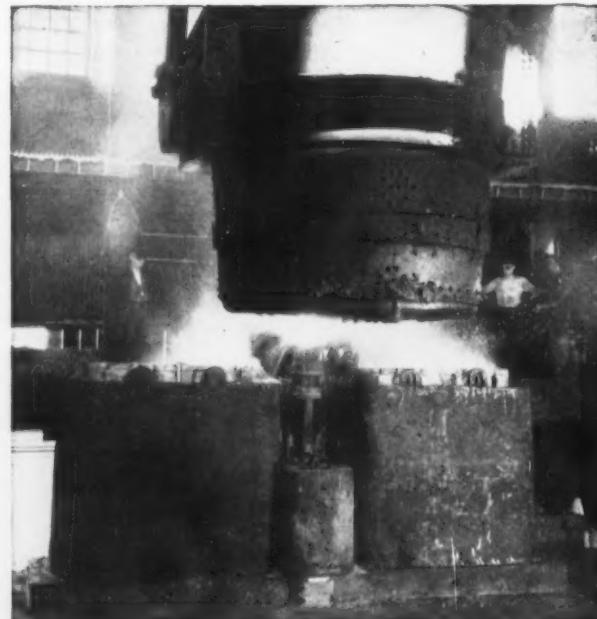
step by step... CLAYMONT BUILDS QUALITY INTO

Our customers have been telling us for years that Claymont Flanged and Dished Heads successfully meet every requirement for top quality. The reason behind such high performance is that we build quality into every head throughout every stage of production—from raw materials to finished product. Here's how:



After rolling the ingots into plate, steel circles are sheared to exact size and then heated in huge furnaces like this to the proper temperature for spinning.

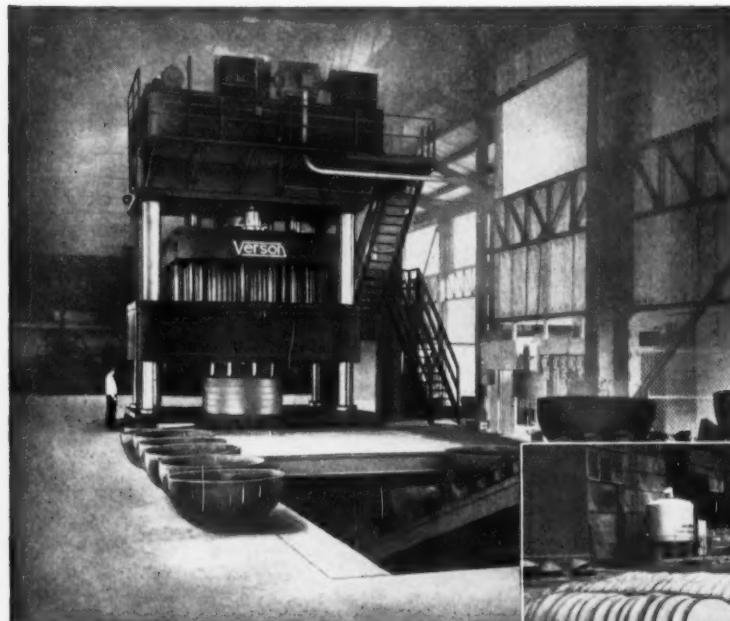
This highly skilled craftsman is operating a big spinning machine which produces heads up to 19 feet in diameter. Every head he makes is subjected to careful inspections, both during and after forming.



Because we make our own steel, we can carefully control its chemical and physical properties. Here, steel is being "bottom-poured". This means that the ingot mold is filled from the bottom, thus assuring a more uniform steel.



ITS FLANGED AND DISHED HEADS



Claymont's head pressing facilities include this new 3000-ton giant, capable of hot or cold forming large diameter heads up to 10 feet. With this modern equipment, Claymont can press steel heads that will meet your most exacting specifications.

Stock Heads—You can be sure of quick delivery when you order from Claymont. That's because CF&I maintains large stocks of popular size heads, as well as many types of fittings for tanks and pressure vessels, at these warehouses: Los Angeles, Tulsa, Houston, New Orleans, Chicago, Buffalo and Claymont, Delaware.



and don't forget
these other important
members of the
Claymont family...

- Alloy Steel Plates
- Stainless-Clad Plates
- CF&I Lectro-Clad Nickel Plated Steel Plates
- Fabricated Steel Parts
- Large Diameter Welded Steel Pipe

Like our heads, all Claymont products have quality built in—by just such painstaking controls and tests during every step of manufacture. For complete information on any Claymont product, contact our nearest sales office or write direct to Wickwire Spencer Steel Division, The Colorado Fuel and Iron Corporation, P.O. Box 1951, Wilmington, Delaware.

4223



Claymont Steel Products

Products of Wickwire Spencer Steel Division • The Colorado Fuel and Iron Corporation

Albuquerque • Amarillo • Atlanta • Billings • Boise • Boston • Buffalo • Butte • Casper • Chicago • Denver • Detroit • El Paso • Ft. Worth • Houston • Lincoln (Neb.) • Los Angeles • New Orleans • New York • Oakland • Odessa • Oklahoma City • Philadelphia • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco • Seattle • Spokane • Tulsa • Wichita
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Pay for Norton grinding machines while they build



*Now you can buy or lease
the most modern grinding
or lapping equipment
on convenient,
economical terms*

For Further Information

see your Norton Representative. He will be glad to discuss the relative merits of each Norton financing method, with regard to your particular requirements. He will also give you complete details of the various machines available and advise you as to which are best suited to your production needs. Or you can write direct. And remember: only Norton offers you such long experience in both grinding machines and grinding wheels to bring you the "Touch of Gold" that helps you produce more at lower cost. NORTON COMPANY, Machine Division, Worcester 6, Mass.

By replacing your obsolete grinding and/or lapping equipment with new Norton machines you can meet competition with the best production tools in the field.

You can now gain this competitive strength without risking financial weakness. Two Norton methods offer you logical, economical ways to modernize without jeopardizing your capital position — and without the need of borrowing or of raising money by any other means.

THE NORTON PURCHASE FINANCING PLAN

This Time Payment Plan enables purchase of new machines on extended terms. Simplicity is the keynote. Upon a down payment of 25% of the original purchase price, terms may be extended up to a maximum of five years, at an interest charge of 3 1/4% per year. Payments are equal and quarterly, starting 60 days after delivery. In the event that you wish to pay off the entire balance at any time, a discount approximately equal to the unearned interest will be allowed.

THE NORTON LEASE PROGRAM

This Program includes three tested plans for leasing new Norton grinding or lapping machines. Each plan offers you the option of terminating the lease or purchasing the equipment after a stated period. Particular advantages of the Lease Program are: (1) You can acquire needed machines for just the period in which you can use them profitably, thus eliminating the obsolescence factor; (2) You can make a thorough trial of equipment without going to the expense of actual purchase, unless you decide to do so later.

A Wide Choice of Machines

Norton machines available under the Purchase Financing Plan and Lease Program include a broad selection of the most popular types of grinders and lappers. Special arrangements will be considered whenever other Norton machines are required.

To Economize, Modernize with NEW



GRINDERS and LAPERS

Making better products... to make your products better

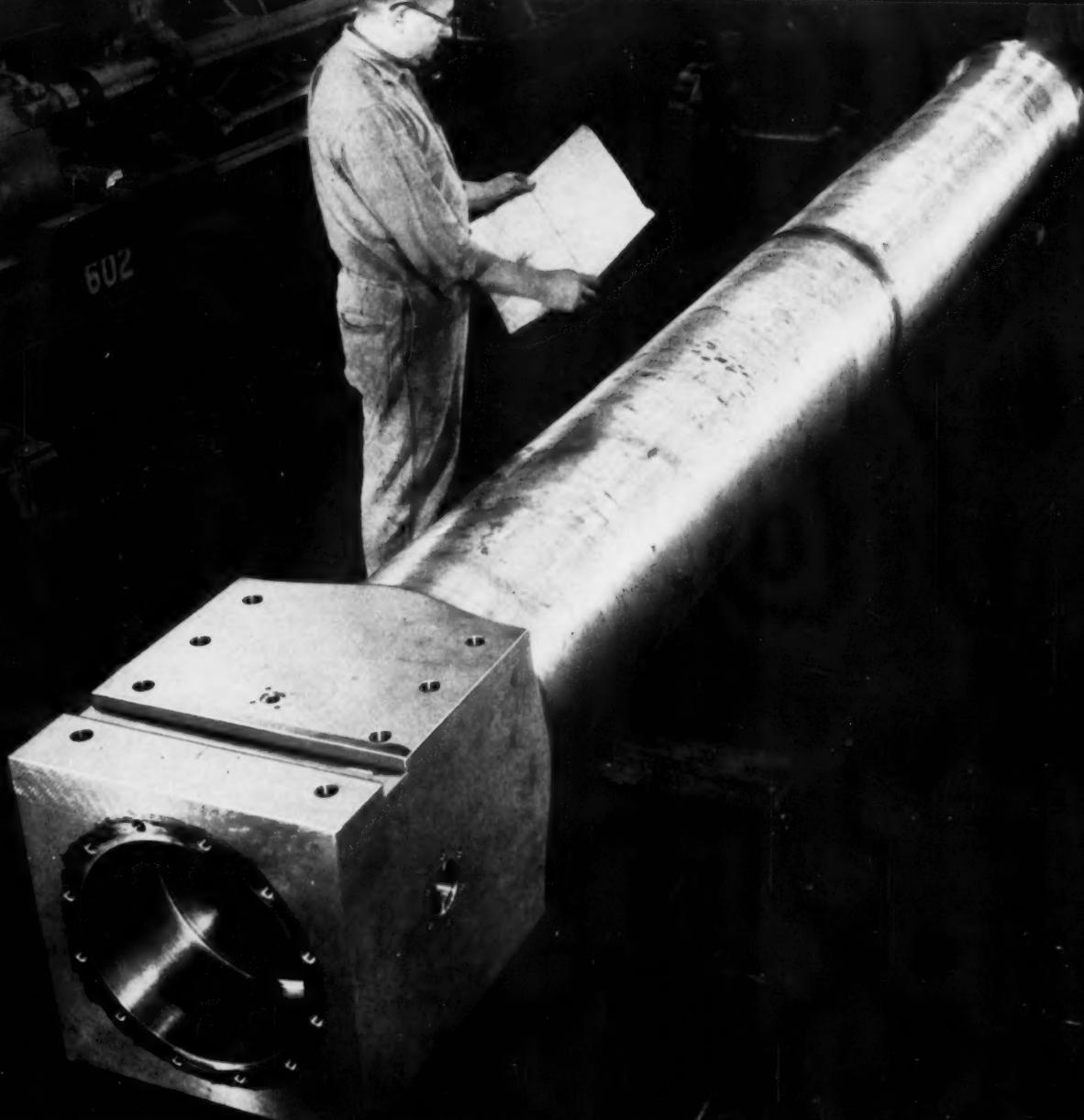
NORTON PRODUCTS: Abrasives • Grinding Wheels

Grinding Machines • Refractories

BEHR-MANNING PRODUCTS: Coated Abrasives

Sharpening Stones • Behr-cat Tapes

District Offices: Worcester • Hartford • Cleveland • Chicago • Detroit



A WHOPPER! WHO MADE IT?

A specialist in big forgings, that's who, and that's us . . . one of the very few companies equipped to handle such a big job. When *you* need a cylinder forging like this, we'll do the *whole job*, including final machining, to tolerances as close as $\pm .001$ "; or we'll produce in rough finished form with the final machining left to you; or we'll harden and temper the steel, doing the entire job to your exact specifications.

For the hydraulic cylinder in the photo above, we poured an electric steel ingot, forged it, hollow-bored

it, lapped it, and polished it to a cylinder finish—we could do all of this . . . do it well and do it economically—because we are specialists and ours is a completely integrated plant. We'll produce *your* big forgings too—exactly to your specifications.

"WHO MAKES THE BIG ONES . . . BEST?"

NATIONAL FORGE
AND ORDNANCE COMPANY

IRVINE (WARREN COUNTY), PENNSYLVANIA

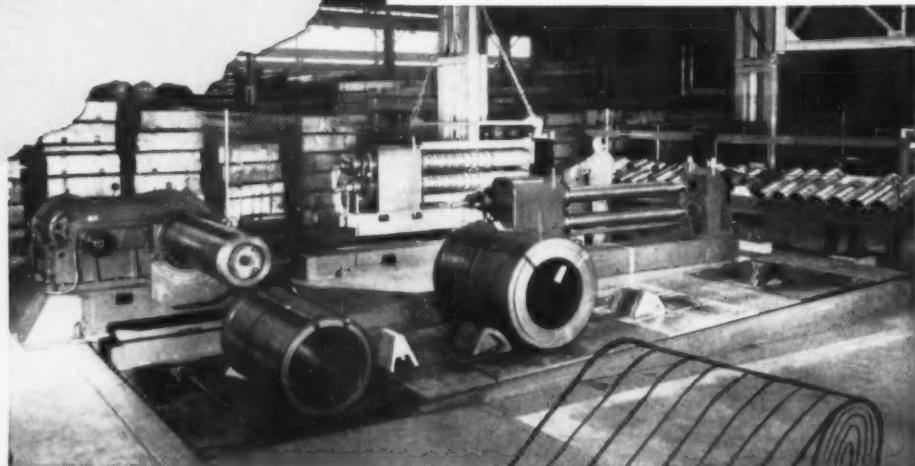
To see more of "the big ones," and the machinery they're made on, write for Bulletin NFO-1.

Step Up Production
with
Stamco
Coiling Lines

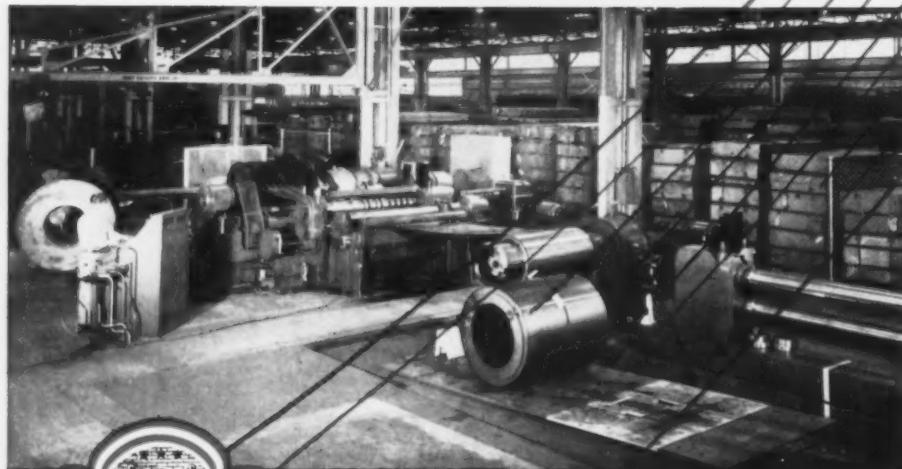
Stamco Slitting and Coiling Lines will step up your production because they are designed to meet your particular specifications. Years of experience have led to the development of equipment that will meet every slitting and coiling requirement. Stamco slitting and coiling lines are now efficiently handling coils from 500 to 60,000 pounds and are designed to give dependable, maintenance-free service.

Write us, stating your requirements . . . we'll gladly give complete details—no obligation.

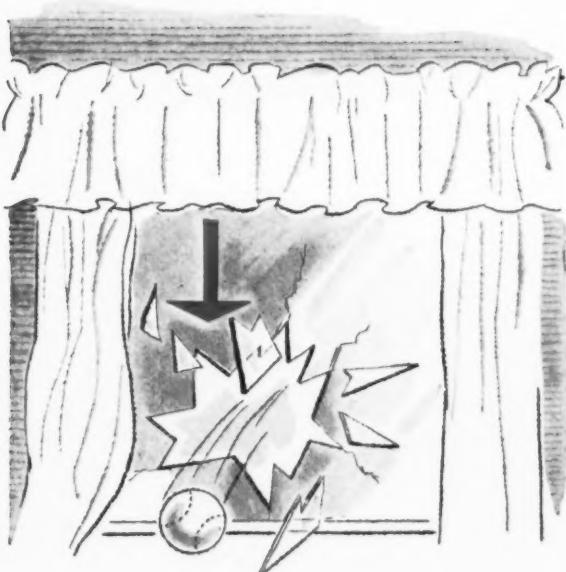
View shows coil and traverse, coil pay off reel, coil loading ramp and detachable slitter head.



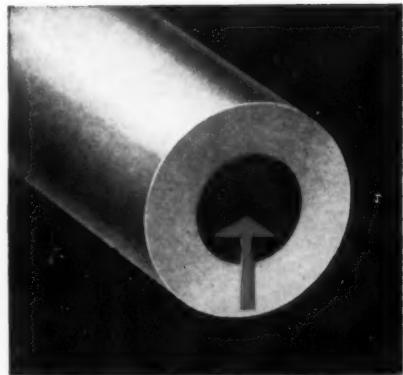
Overall view of coiling line from entrance end.



STAMCO, Inc., New Bremen, Ohio



a hole here means work...



a hole here saves work

Crucible Hollow Tool Steel Bars take much of the work out of making ring-shaped steel parts, or tools with a center hole. The hole's already there. You save expensive drilling, boring, cutting-off and rough-facing operations . . . you reduce machine time and scrap losses.

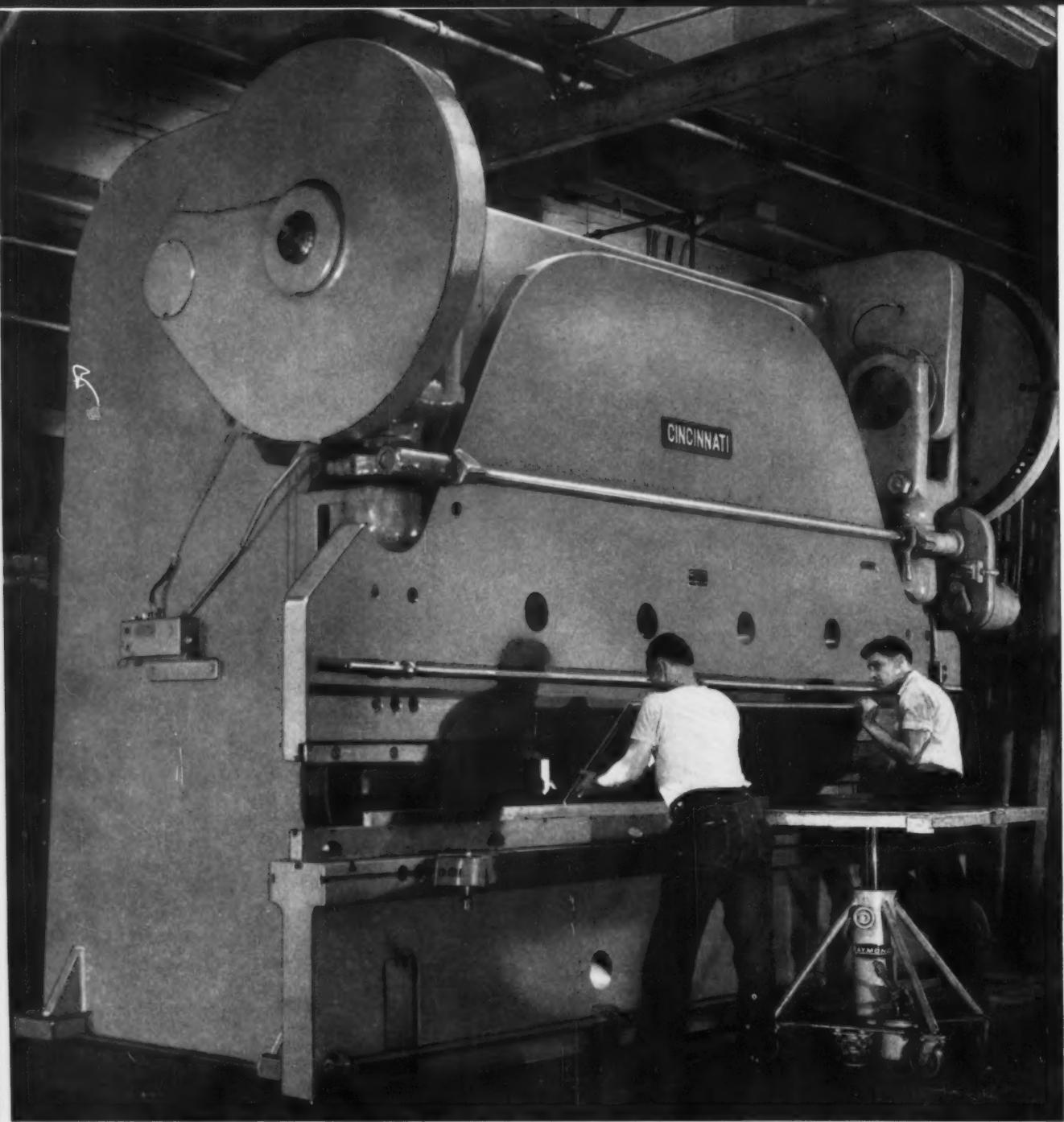
You can now get Crucible Hollow Tool Steel Bars in any of the famous Crucible tool steel grades, in virtually any I.D. and O.D. combination. And you can get *immediate delivery* from stock of the five most useful grades — KETOS oil-hardening . . . SANDERSON water-hardening . . . AIRDI 150 high-carbon, high-chromium . . . AIRKOOL air-hardening . . . NU DIE V hot-work tool steels.

Your Crucible representative can quickly show you how Crucible Hollow Tool Steel Bars will save you work and money. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE

first name in special purpose steels

Crucible Steel Company of America



This 13 Series x 12' Cincinnati Press Brake has a capacity of 250 tons and is used for many types of forming and punching work at the Falstrom Plant.

This 2512 Series Cincinnati Shear has a capacity of $\frac{3}{8}$ " x 12' long mild steel plate, and is used to shear a variety of metals to micrometer accuracy. →

• Photos courtesy Falstrom Company, Passaic, N. J.



THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A.

SHAPERS • SHEARS • BRAKES

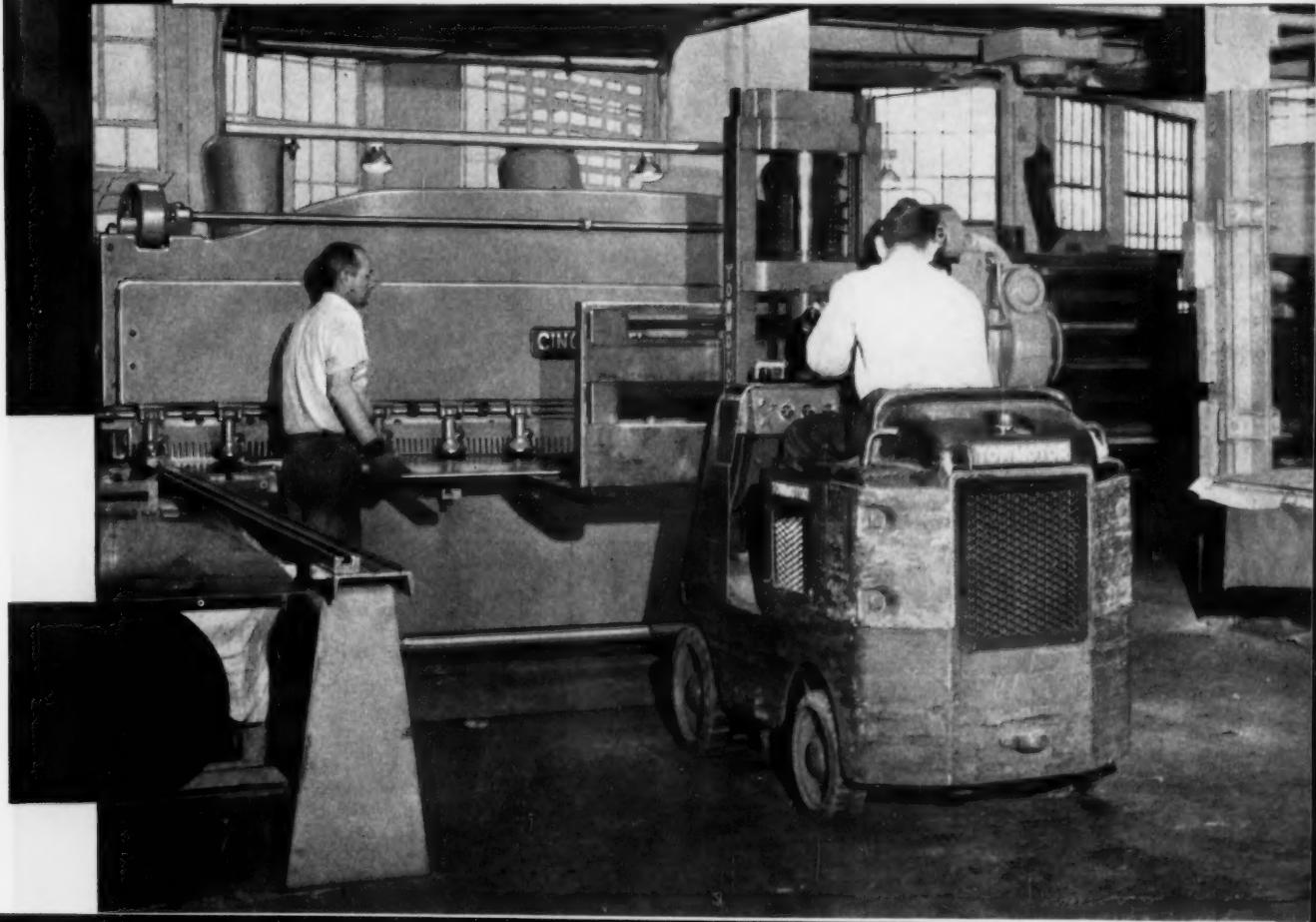
Cincinnati Shears and Press Brakes produce a wide variety of precision custom metal work

at FALSTROM COMPANY, Passaic, N. J.

Three Cincinnati Shears and five Cincinnati Press Brakes are profitable producers in this finely equipped plant. A broad variety of precision work in many different metals is done on these versatile machines, yet changes from job to job are made rapidly with minimum loss of time. Due to the accuracy of their Cincinnati Shears and Press Brakes, Falstrom Company has

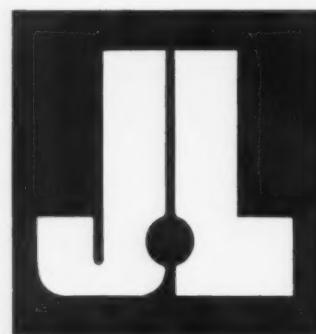
been able to minimize the use of welded construction in their special fabricated products.

Consult our Application Engineering Department about **your** production problems, and write Department B for Catalog S-7R on Cincinnati Shears and Catalog B-4R on Cincinnati Press Brakes.



call on
the
Department
Store
of Steel
for
fast Steel
Service

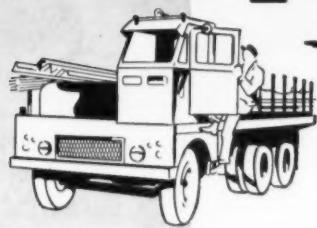
JONES & LAUGHLIN STEEL WAREHOUSE DIVISION



The Department Store of Steel

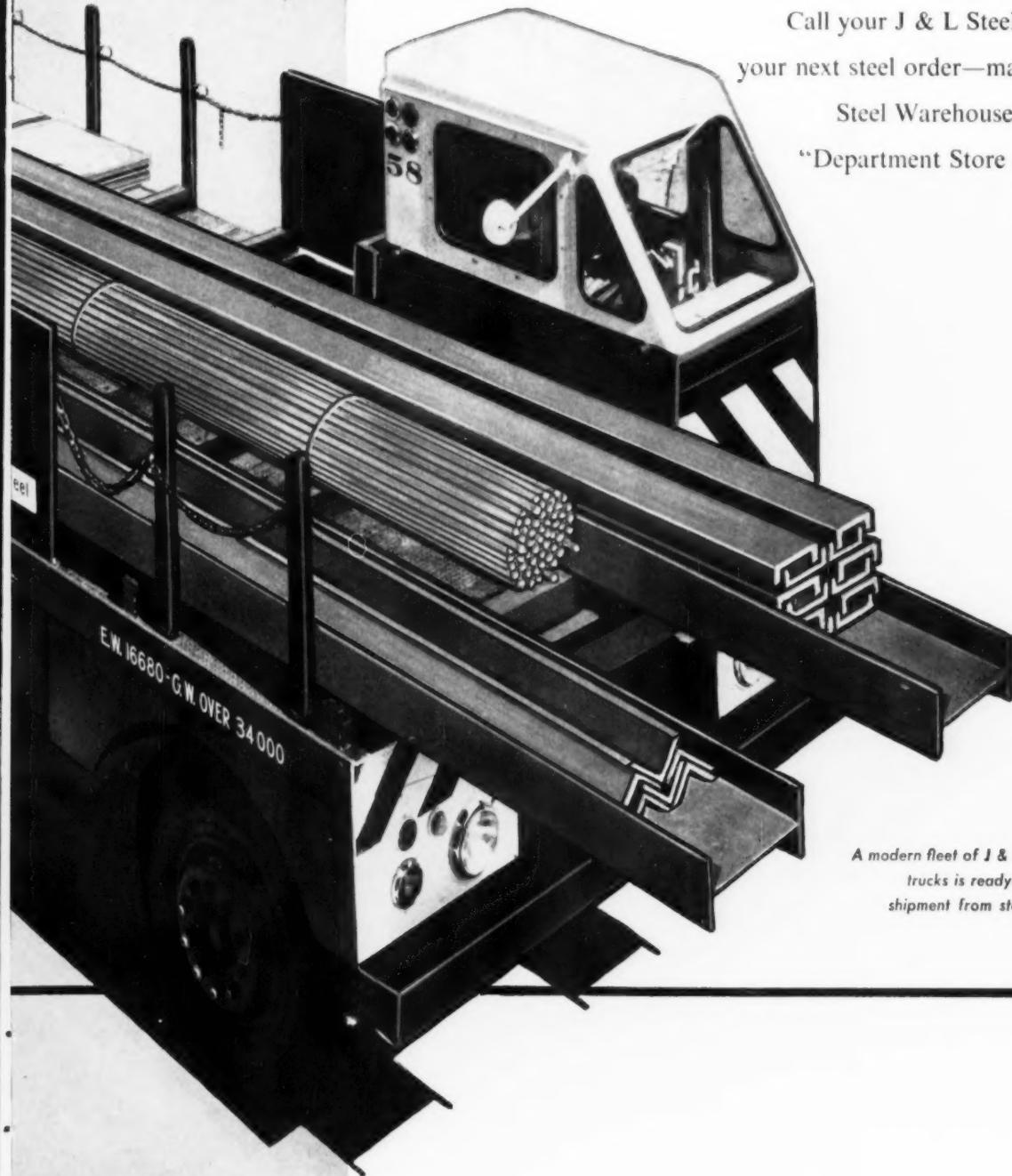


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LOUISVILLE • MEMPHIS • NASHVILLE • NEW ORLEANS • NEW YORK • PITTSBURGH



Your J & L Steel Warehouse specializes in giving you "the steel you want—*when you want it.*" Large and diversified stocks, competent personnel and fast delivery service team-up to help you meet your production schedules and reduce costly steel inventory.

Call your J & L Steel Warehouse for your next steel order—make your J & L Steel Warehouse your "Department Store of Steel."



A modern fleet of J & L steel delivery trucks is ready to give immediate shipment from stock.

JONES & LAUGHLIN STEEL WAREHOUSE DIVISION

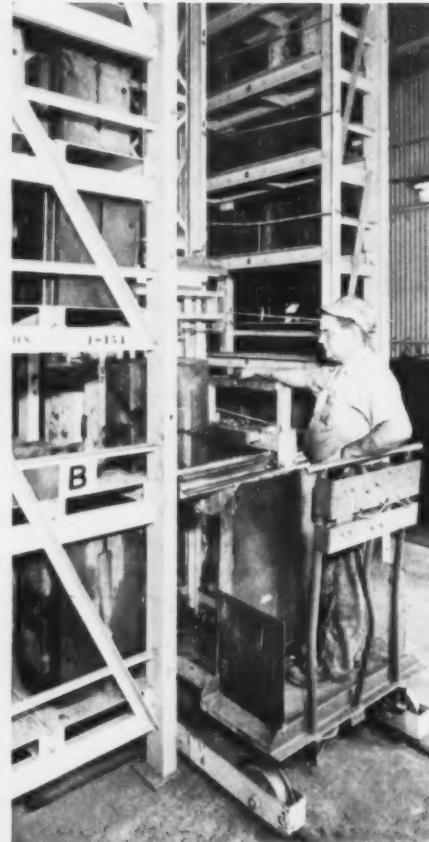
JONES & LAUGHLIN STEEL CORPORATION

DIVISION OFFICES INDIANAPOLIS 7, INDIANA

A 3000 lb. die handled like a feather with these special Economy die-handling Lifters



Economy also make a complete line of standard lifters



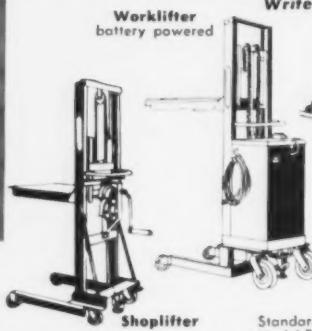
Push-button control for elevating the platform, propelling the machine down the narrow aisles, and moving the dies in and out of the racks, gives finger-tip high speed handling. The storage capacity is multiplied ten times the floor area and with every die located for immediate selection.

This die handling system, Economy engineered and built, is an example of how materials handling problems can be solved by Economy engineers who have specialized in custom-built machines for over 50 years.

Our representatives, trained in engineering, are located in all principal cities. Why not call one in on your material handling or overhead servicing problem?

Write E. W. McDonnell
ECONOMY ENGINEERING CO.
4522 W. Lake St., Chicago 24, Ill.
NEW YORK OFFICE
342 Madison Ave., New York 17, N. Y.

Write for new Catalog No. 55



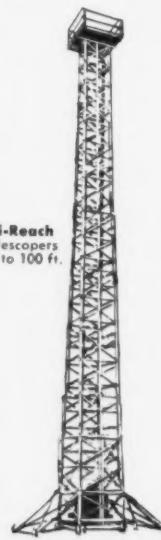
Worklifter
battery powered



Standard Model LB
Hi-Reach
Telescopier for overhead
service. Lifts
20 ft. to 35 ft.



Hi-Reach
Telescopers
up to 100 ft.



ECONOMY
ENGINEERING

new
electro-ground
carbide
end mills
manufactured
by **ELGIN**



Elgin GOLDEN CIRCLE Carbide End Mills . . . solid carbide, of course, for the toughest jobs. But most important, Elgin Golden Circle End Mills are ground by Elgin's new Electro-Grind process which completely eliminates the strains and grinding checks caused by conventional methods. No chance for chipped or flaked cutting edges caused by high temperatures during grinding!

Electro-Grind combined with the use of extra fine grit wheels gives the sharpest, smoothest cutting edges yet—your assurance of the highest quality tools obtainable, increased production, less frequent regrinding, greater accuracy.

Write for new catalog showing complete line of solid carbide end mills, drills, reamers and burs—in stock for immediate delivery.



Abrasives Division

ELGIN NATIONAL WATCH COMPANY

ELGIN, ILLINOIS

Grinds 33% faster

...increases wheel life

● *More power per pound* is the reason why the new *Rotor B-7 Vertical Grinder* does jobs faster. *Application:* Grinding flash and parting lines on cast machine parts. Replaced flexible shaft grinders. *Result:* Boosted output 33%. Savings will pay for the new *Rotor B-7 Vertical Grinders* in 17½ weeks. Operator fatigue is less. Wheels last longer. Downtime now nil.

The nearby Rotor Application Engineer will demonstrate these or other new Rotor Tools on *your* jobs. Write for Bulletin 56 on Rotor Vertical Grinders. The ROTOR TOOL Company, Cleveland 32, Ohio.



Here's the Right
TOOL for YOUR job!

Rotor Air Tools: Assembly Tools • Drills • Small Wheel Grinders
Straight Grinders • Vertical Grinders • Scalers • Chippers • Rammers
Rotor High-Cycle Electric Tools: Grinders • Polishers • Sanders



JESSOP STEEL*

HIGH QUALITY*

GOOD SERVICE*

* *High quality and good service* are apt words to describe what you get when you buy tool and high-speed bar stock from Jessop Steel. Descriptive in the past—even more so today! For, during the last year, Jessop has greatly expanded its laboratory facilities for closer *quality-control* and radically adjusted its warehouse product-mix for *faster service*. Whether you buy bar stock, or any of the other products shown below, you'll find profit in sending your next order to Jessop Steel.

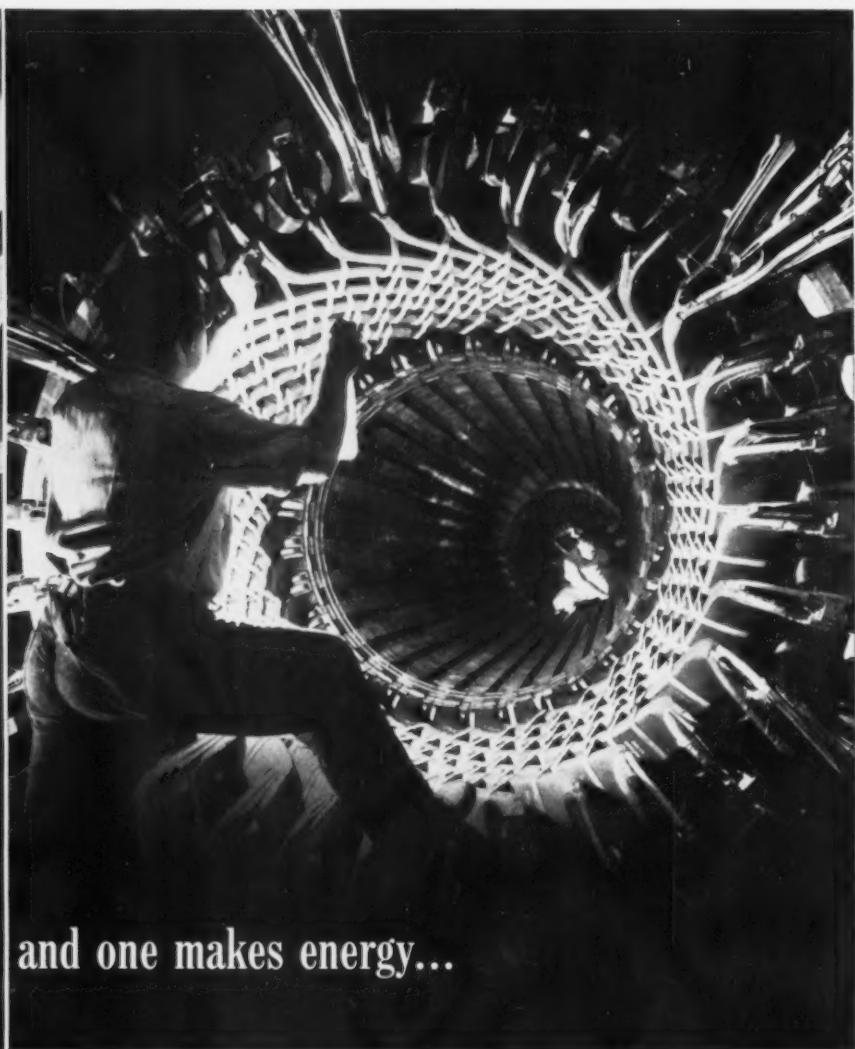
STAINLESS STEELS • HIGH SPEED STEELS • NON-MAGNETIC STEELS • HIGH SPEED TOOL BITS
HEAT RESISTING STEELS • STAINLESS-CLAD PLATES • CARBON AND ALLOY STEELS
TOOL STEELS FOR SPECIAL PURPOSES • CAST-TO-SHAPE TOOL STEELS • HIGH SPEED
AND ALLOY SAW STEELS • TEMPERED AND GROUND STRIP STEEL • COMPOSITE HIGH
SPEED STEELS • STAINLESS AND HEAT RESISTING CASTINGS • COMPOSITE DIE STEEL
SECTIONS • PRECISION GROUND FLAT STOCK • DIE STEELS—HOT AND COLD WORK

JESSOP

STEEL COMPANY • WASHINGTON, PA.

OFFICES IN PRINCIPAL CITIES

Jessop Steel of Canada Limited, Wallaceburg, Ontario
Jessop Steel International Corp., Chrysler Building, New York, New York



One keeps time and one makes energy...

both are vapor degreased in Columbia-Southern Trichlorethylene

Vapor degreasing has proved an ideal process for fast, efficient and economical cleaning of metal parts ranging in weight from fractions of an ounce up to thousands of pounds. The massive, 268 ton generator stator (right, above) can be degreased as thoroughly as the 1/240 oz. watch gear. It's been done. Like putting a diamond and the Rock of Gibraltar in the same bathtub, you say? In a way, it is... with the "water" just right for both.

Columbia-Southern's *neutrally stabilized* Trichlorethylene is rapidly becoming the preferred vapor degreasing solvent. In vapor or liquid form, it leaves the widest possible range of metals dry and free of contaminants. In seconds, parts are ready for immedi-

ate fabrication, painting, and in most instances, plating.

Made to extremely rigid standards of controlled quality by the world's leading merchant producer of chlorine, Columbia-Southern Trichlorethylene is non-flammable for greatest safety in use. Its high vapor density and low boiling point keep vapor losses very low... a crucial consideration when you're selecting solvents. And Columbia-Southern Trichlorethylene is set apart from others by its exclusive neutral type of built-in stabilization. This superior solvent is not formulated around highly alkaline amines that merely attempt to neutralize acid breakdown products. Rather, the neutral stabilizer "locks" the solvent

against decomposition under light, heat, oxygen, acids, moisture, and repeated distillations.

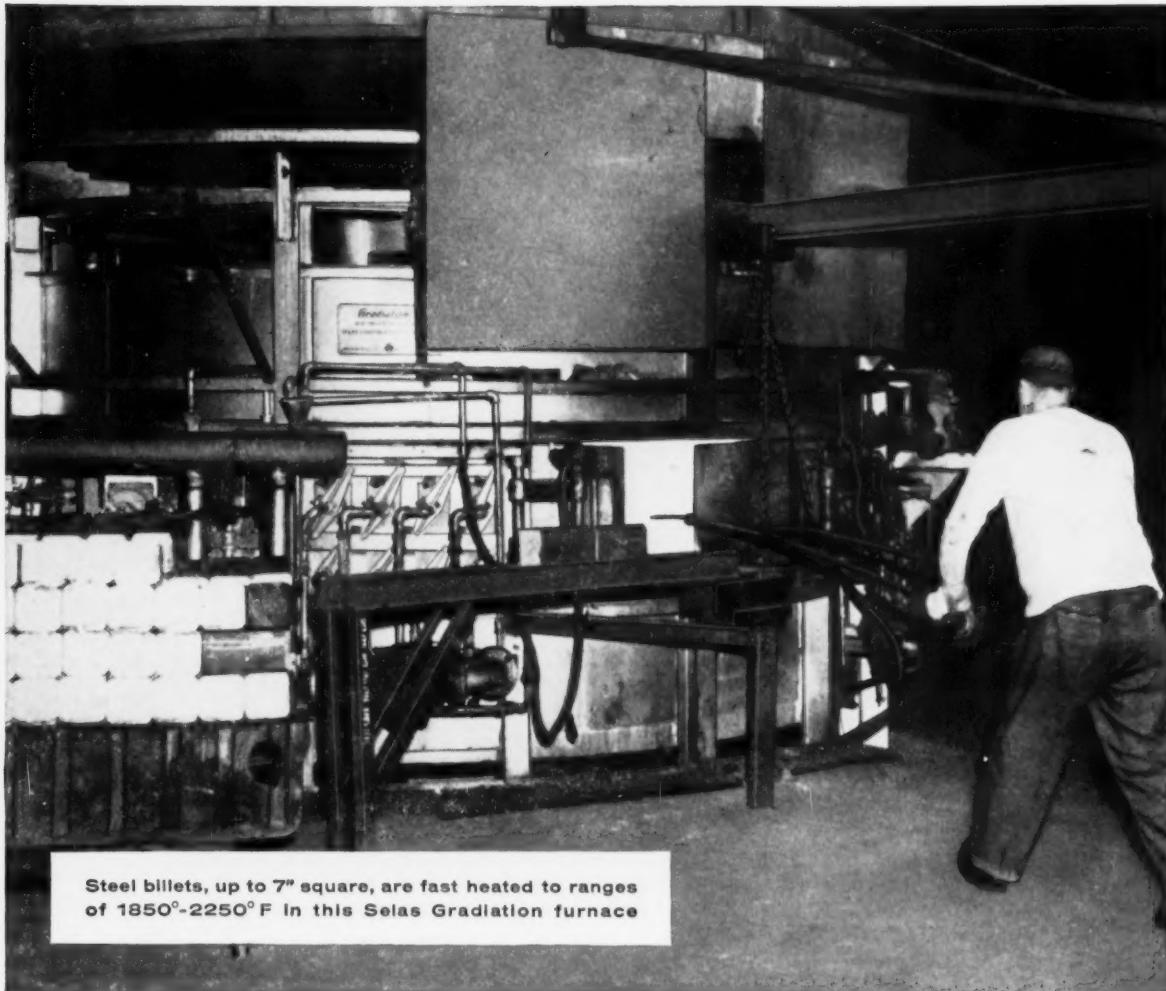
Columbia-Southern Trichlorethylene is available in tank cars, tank trucks, and drums. For further information, write today to your nearest Columbia-Southern sales office or to your solvents distributor.

COLUMBIA-SOUTHERN CHEMICAL CORPORATION

SUBSIDIARY OF PITTSBURGH PLATE GLASS COMPANY
ONE GATEWAY CENTER • PITTSBURGH 22 • PENNSYLVANIA



DISTRICT OFFICES: Cincinnati • Charlotte
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Pittsburgh • Dallas • San Francisco
IN CANADA: Standard Chemical Limited
and its Commercial Chemicals Division



Steel billets, up to 7" square, are fast heated to ranges of 1850°-2250° F in this Selas Gradiation furnace

FAST HEATING WITH *GAS*

- improves forgeability
- reduces power requirements
- increases metal flow

A Gas-fired Gradiation® furnace designed and built by Selas Corporation for Lansdowne Steel and Iron Company, Morton, Pennsylvania heats billets to 1850°-2250° F at rates of 2 to 5 minutes per inch of thickness—thus virtually eliminating scale. Some fast heated billets are forged at temperatures 300° F below conventional methods.

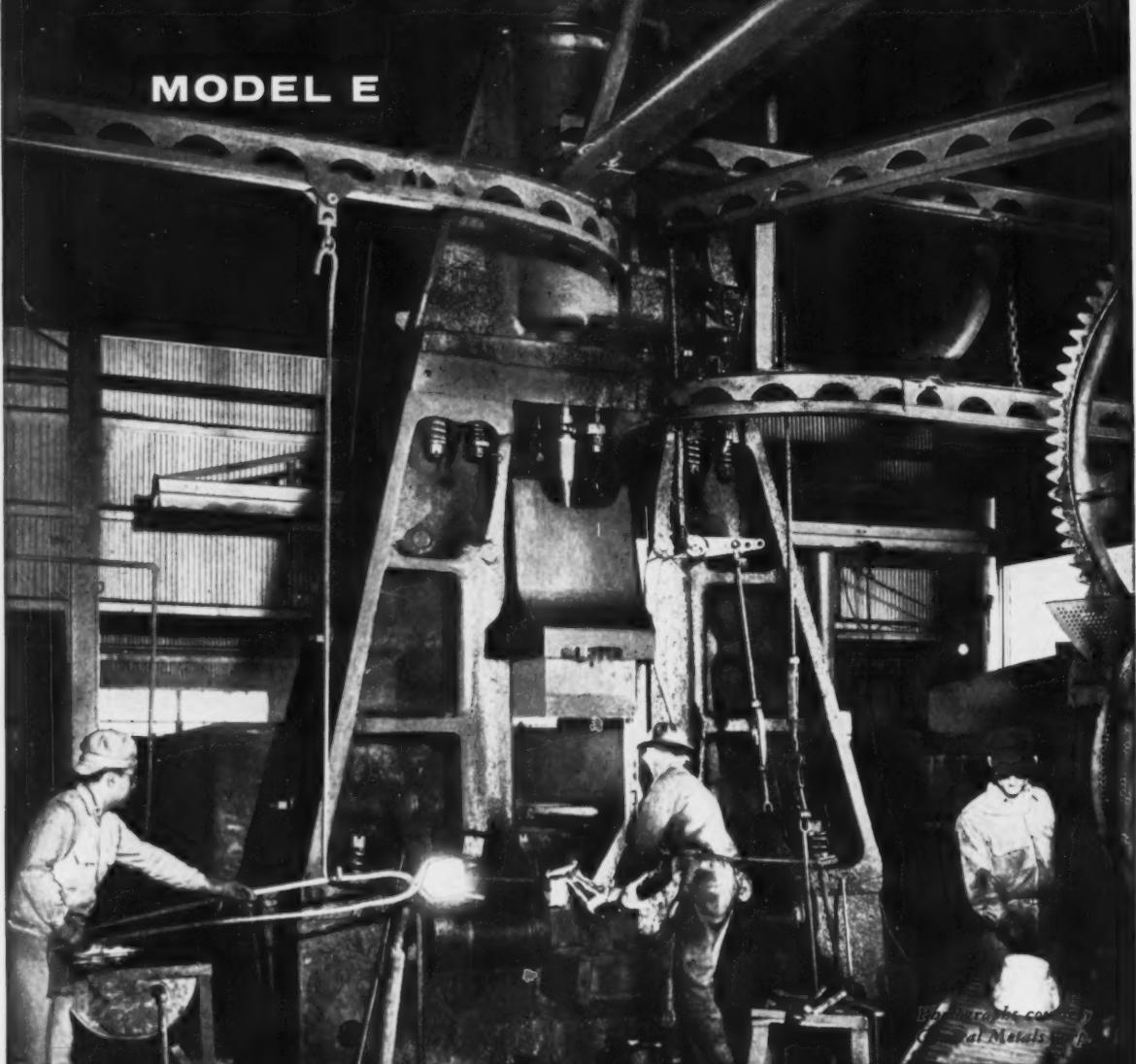
Improved forgeability, directly attributable to fast heating with Gas, reduces power requirements

at the usual forging temperatures. Or, for given power applied, permits an increase in the amount of flow or deformation.

For information on how Gas equipment can help you in your production operations, call your Gas Company's industrial specialist. He'll be glad to discuss the economies and outstanding results you get with Gas and modern Gas equipment. *American Gas Association.*

CHAMBERSBURG STEAM DROP HAMMERS

MODEL E



MODERN FORGING REQUIREMENTS DEMAND MODERN HAMMERS.

Shown above is a 6000 lb. Model "E" Chambersburg Steam Drop Hammer forging 4" alloy steel valve bodies. A Chambersburg 200 ton Steel Side Trimming Press is used to complete the operation. The Chambersburg Model "E" Hammer pays its way through increased production and trouble-free service. Details of this modern hammer are in our Bulletin No. 55-L-4. If interested, write for a copy.



Trimming Forgings on
Chambersburg Trimmer

CHAMBERSBURG ENGINEERING COMPANY • CHAMBERSBURG, PA.



Spring steel within this range...

FOR THE MOST EXACTING NEEDS KNOWN TODAY!

• That this is the age of specialization is certainly true in the use of steels. And in this regard *Athenia Steel* customers benefit especially by two not-too-common factors. First, by extreme control of quality and uniformity, unsurpassed, seldom equalled *anywhere!* Secondly, by painstaking technical service to determine or develop precisely the right steel for any special need.

Here at Athenia we concentrate on cold rolled high

carbon flat steels, custom made of .45 carbon and higher, in widths from .015" to 16" and thicknesses from .001" to .065". Full range of finishes and tempers. We also produce special narrow width stainless, and the new super-tough, corrosion resistant spring material, Nilcor*.

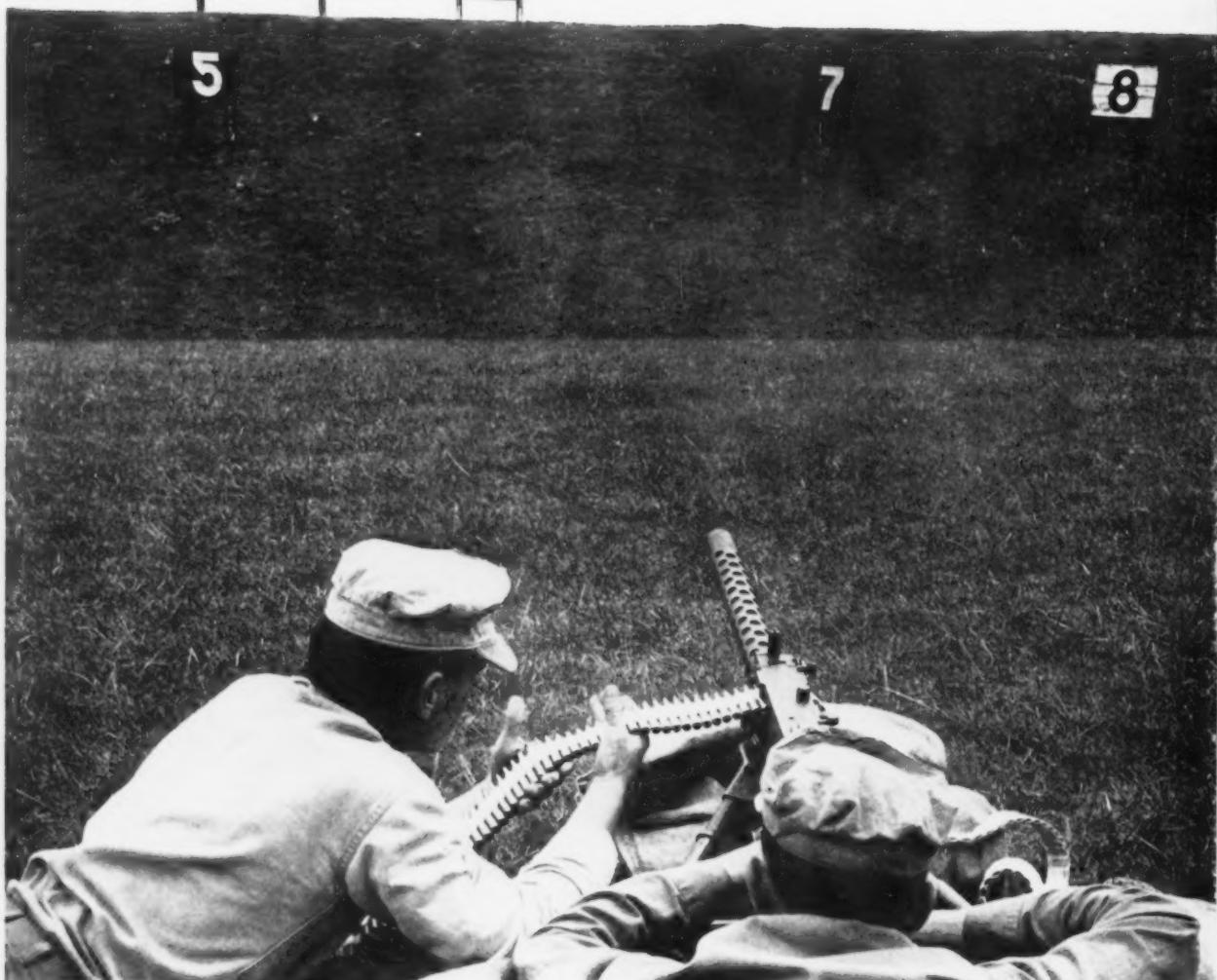
For a new and profitable experience in service and in steel controlled precisely to *your* needs... try us!

*Trade Mark National Standard Company

NATIONAL STANDARD



DIVISIONS: NATIONAL-STANDARD, Niles, Mich.; tire wire, stainless, music spring and plated wires • WORCESTER WIRE WORKS, Worcester, Mass.; high and low carbon specialty wires
WAGNER LITHO MACHINERY, Secaucus, N. J.; metal decorating equipment • ATHENIA STEEL, Clinton, N. J.; flat, high carbon spring steels • REYNOLDS WIRE, Dixon, Ill.; industrial wire cloth



LEATHERNECKS FAIL TO FLAKE TI-CO®



Close-up inspection of the bullet holes in TI-CO. Not one sign of coating failure.

Two husky Marines teamed up with a Browning .30 caliber machine gun to pour two hundred rounds of armor-piercing ammunition into a sheet of Inland TI-CO galvanized steel.

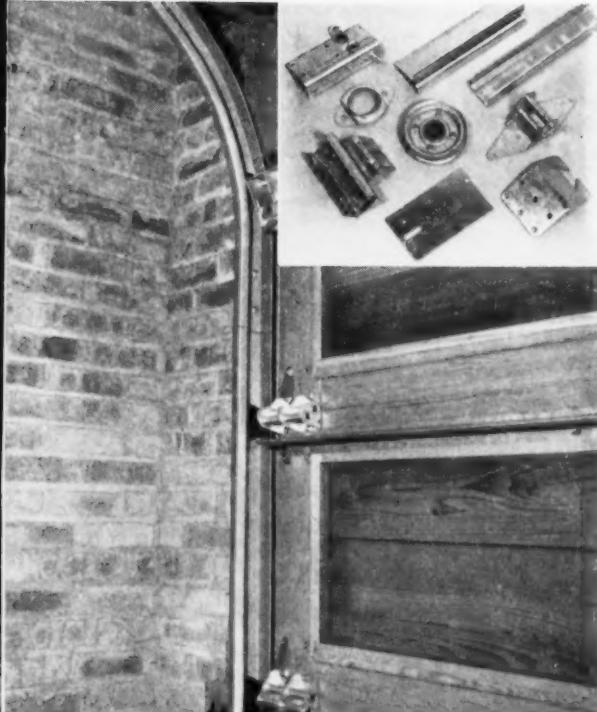
Despite the smashing contact of slug after slug, TI-CO showed not a crack, not a chip, not a trace of peeling or flaking. The protective zinc

coating on TI-CO stayed put...to the very edge of the holes.

If speeding bullets fail to flake TI-CO... you can be sure that even the most severe fabricating operations or the roughest, toughest handling will not flake TI-CO's coating. That means positive protection for the base metal. No chance for rust to get a foothold.

Switch to TI-CO galvanized sheets save manufacturers up to 15%

TI-CO eliminates re-dipping . . . painting . . . plating and improves saleability of products



1. Well-known garage door manufacturer reports cost-savings of more than 10% when they eliminated plating operations on hardware by changing over to TI-CO galvanized sheets. Change resulted in a good looking, more durable product, too.

Wherever corrosion resistance is a requisite in a product, non-flaking Inland TI-CO galvanized sheets offer important advantages to the manufacturer in reduction of costs and in product improvement. This is because TI-CO can take any fabricating

operation that can be performed on cold rolled steel without flaking of the zinc coating.

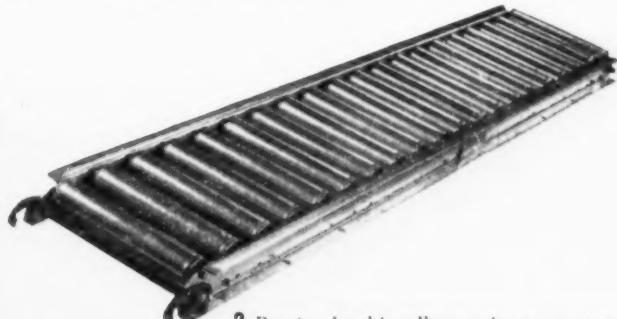
If you are presently manufacturing or designing a product in which corrosion resistance is a factor, it will pay you to investigate TI-CO galvanized sheets.

Write today for a free informative booklet on TI-CO to:

INLAND STEEL COMPANY

38 South Dearborn Street • Chicago 3, Illinois

Sales Offices: Chicago • Milwaukee • St. Paul • Davenport
St. Louis • Kansas City • Indianapolis • Detroit • New York



2. Previously, this roller gravity conveyor was made from hot rolled sheets and then it was either zinc-dipped or painted. Now, it's fabricated from TI-CO and the costs of dipping and painting have been removed. Non-flaking TI-CO also adds important sales feature of positive insurance against corrosion.



3. Leading furnace manufacturer saves \$20.00 per thousand, or approximately 15% of total costs, on the production of this plenum take-off since he switched from cold rolled sheets to TI-CO.

TI-CO takes the tough 4-inch draw in stride with no flaking of the protective zinc coating. Cleaning and painting of product after forming have been eliminated.

TI-CO is manufactured in coils and cut lengths with oiled or chemically treated surfaces. For complete information, consult your local steel distributor or Inland sales representative.



look for this brand—
your assurance of
non-flaking performance

Penetrate the Thermal Barrier



MicroMach extra-high-tensile stainless steel sheets up to 48" WIDE for aircraft and missile use

As the speed of today's aircraft rapidly approaches the Thermal Barrier, conventional metals are being left far behind in the race to satisfy the structural requirements of supersonic craft. Needed are metals that can withstand the intense heat caused by air friction at high speeds and still retain their strength. One such metal, MicroMach stainless, has been in use for more than a year.

MicroMach is a special aircraft and missile

grade of modified type 301 stainless steel sheet furnished to higher mechanical properties than are available in other commercial high tensile grades in the full hard condition.

These sheets are rolled to extremely close tolerances (as low as plus or minus 3%) with micro-accuracy and precise uniformity of gauge. The surface of MicroMach sheet is smooth, clean and dense; qualities so important in minimizing surface friction.

For further information write to Aircraft Steels Dept.

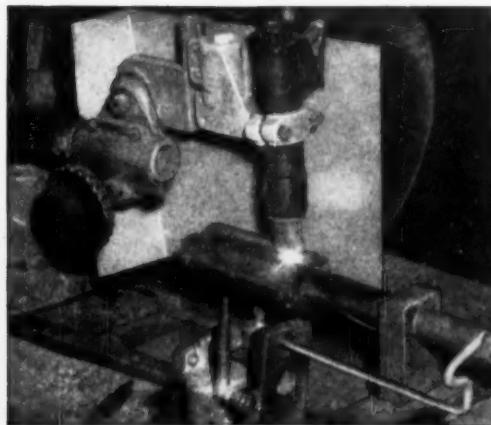
Washington Steel Corporation
2-L WOODLAND AVENUE
WASHINGTON, PA.



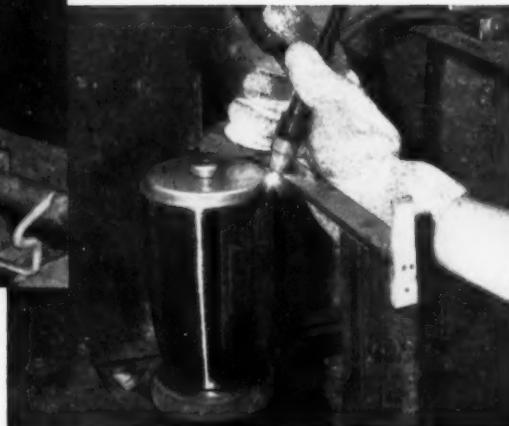
MicroRold stainless steel is also available in all popular grades and to meet regular government specifications. Sheets up to 36" wide can be had as thin as .005", and over 36" to 48" wide as thin as .010" in all commercial finishes and tempers.

GAIN NEW SPEED AND WELD QUALITY

in light-gage metal
fabricating



HELIARC welding has increased both the production speed and weld quality of these stainless steel parts.



Throughout industry, from production line operations to one-of-a-kind jobbing, HELIARC argon gas-shielded welding is helping fabricators gain new top weld-quality and production speed. These typical pictures show how HELIARC welding is used to efficiently fabricate sections of the Cory "Crown Jewel" percolator.

SETUPS DESIGNED TO FIT JOB NEEDS

These .031 in. type 302 stainless steel parts are fabricated in two fast, efficient operations. A mechanized HELIARC torch is used to butt weld a seam in the percolator's spout—and a stationary HELIARC torch welds the bottom section of the unit's body while parts rotate.

WELDING IS FAST, WELDS ARE SOUND

It takes only a few seconds to complete a 4½-in. long butt weld in the percolator spout. In the second HELIARC welding setup, a 17-in. circumferential weld on the percolator bottom is completed in only a fraction of a minute.

WIDE RANGE OF EQUIPMENT AND APPLICATIONS

HELIARC welding setups are available for manual, semi-automatic, and automatic operations. All are ideal for a wide range of light-gage metal jobs. Call your local LINDE representative and find out which HELIARC welding apparatus is best suited for your fabricating needs. Start saving now—call today.

Linde Air Products Company
A Division of Union Carbide and Carbon Corporation

30 East 42nd Street  New York 17, N. Y.

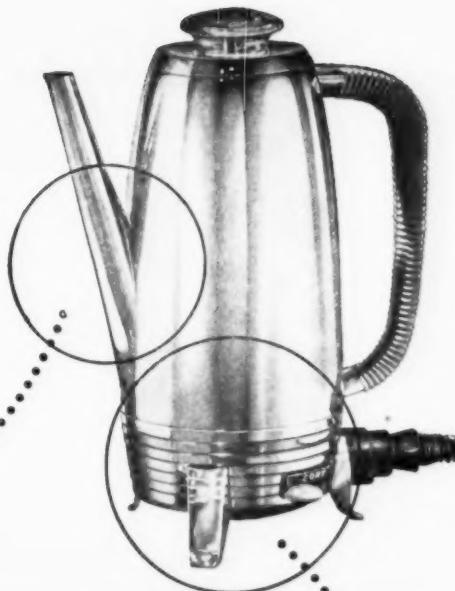
Offices in Other Principal Cities

In Canada: LINDE AIR PRODUCTS COMPANY

Division of Union Carbide Canada Limited, Toronto

"Heliarc" and "Linde" are registered trade-marks of Union Carbide and Carbon Corporation.

February 14, 1957



CLEVELAND Fabricating Tools

PUNCHES • SHEARS • PLANERS • DRILLS
BENDING or STRAIGHTENING ROLLS



WHATEVER your metal fabricating needs, chances are you'll solve them best with Cleveland engineered equipment. You can be sure of dependable, economical performance, for all Cleveland machines, both special and standard, benefit by our 75 years of experience in this field.

Shown here are a few of this extensive Cleveland line. We will gladly furnish you with complete specifications covering any type of Fabricating Tool in which you may be interested.

A-7581

Write for your copy of Cleveland Fabricating Tools!



THE CLEVELAND PUNCH & SHEAR WORKS COMPANY

CLEVELAND 14 • OHIO

NEW YORK • CHICAGO • DETROIT • PHILADELPHIA • E. LANSING



KEYSTONE Galvanized MB Spring Wire exceeds Automotive Engineers' Specifications for

THE WEATHERHEAD COMPANY



Automotive engineers drew up the specifications for this wire control conduit: Must retain flexibility, resist crushing, hold lubricant and exclude dust and water even when flexed frequently, and give long, trouble-free service.

To more than meet these exacting specifications, The Weatherhead Company, Cleveland, Ohio, one of the leading manufacturers of brake hose, fittings and flexible controls, selected Keystone Galvanized MB Spring Wire.

Weatherhead has found that the superior uniform tensile strength, coiling characteristics, corrosion resistance and extra strength of Keystone Galvanized MB Spring Wire produce quality flexible control cables and assure trouble-free production.

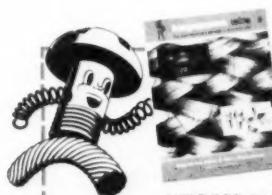
The outstanding qualities of Keystone Galvanized MB Spring Wire are the result of Keystone's exclusive method of galvanizing the wire before it is cold-drawn. The drawing process smooths and hardens the galvanized finish and improves its lasting qualities as well as its appearance.

Keystone Galvanized MB Spring Wire is furnished in Type 2 and Type 3 heavy weight zinc coatings before drawing to meet specified salt spray tests.

Do you have special wire forming problems? Keystone's metallurgical research and testing facilities are at your service. For complete details, call your Keystone representative. He's at your service.

Keystone Steel & Wire Company, Peoria 7, Illinois

KEYSTONE
WIRE FOR INDUSTRY



KEYSTONE STEEL & WIRE COMPANY
Peoria 7, Illinois

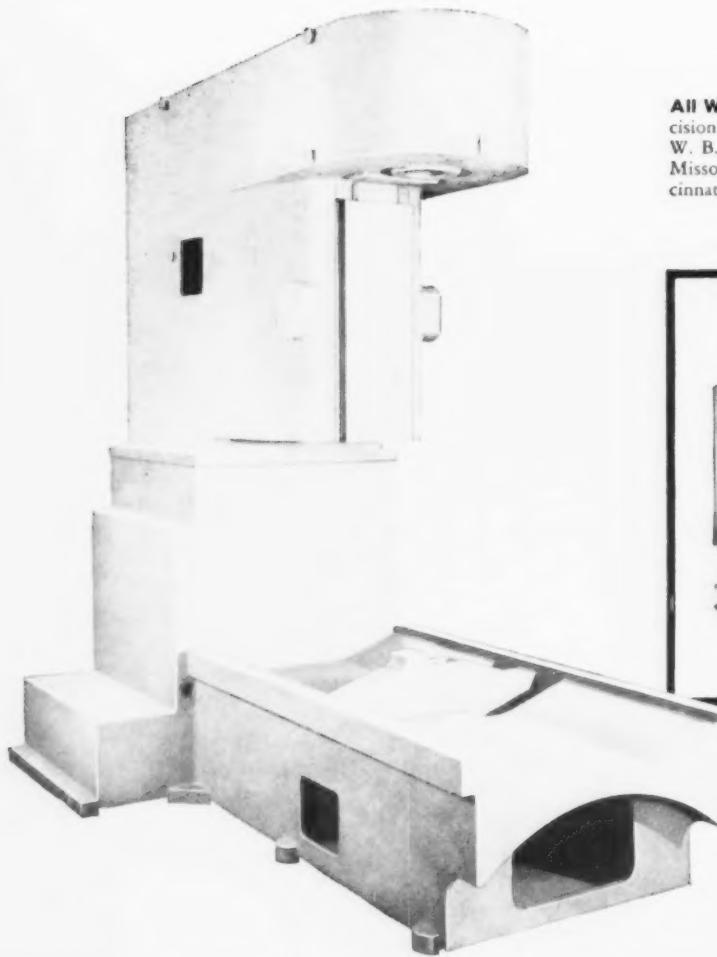
Mail coupon for free booklet—
WIRE FORMING AND COLD HEADING FACTS! Discusses methods, technical facts, wire requirements and other data.

Name _____ Title _____

Company _____

Street _____

City _____ State _____



All Welded Steel Base and Column for precision milling and boring machine. Designed by W. B. Knight Machinery Company, St. Louis, Missouri. Fabricated by Littleford Brothers, Cincinnati, Ohio.



MORE RIGID TO HOLD CLOSER ALIGNMENT

...Welded steel design makes it possible at lower cost

BY proper use of welded steel construction, many types of machines can be built to hold closer alignment and maintain higher tolerances. This is possible because steel is $2\frac{1}{2}$ times as rigid as iron.

Because steel designs use less material, and because steel costs only a third as much per pound as iron, costs can be lowered substantially.

On these precision machines, rigidity for close

alignment is combined with modern appearance. Additional savings in cost are possible since patterns and castings are eliminated.

Benefits like these could be duplicated in your designs. Lincoln's 45 years of cost-cutting experience can show you how.

Designers and engineers write for bulletins on designing for steel.



THE LINCOLN ELECTRIC COMPANY

Dept. 1528, Cleveland 17, Ohio

When steel is three times stronger than iron

Has $2\frac{1}{2}$ times the rigidity

Yet costs $\frac{1}{3}$ as much

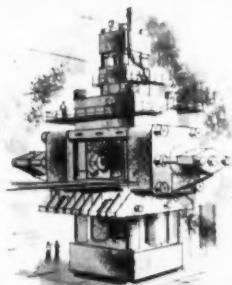
WHY
aren't all your products
designed for welded steel



Cameron Split-Die forgings

are different — they are made possible by something new in the metal-working industries. Intricate ferrous forgings with internal as well as external contours are being mass-produced. These near-final shapes with greatly improved grain structures are creating a new concept in the design and use of forgings.

Cameron's split-die forgings offer a variety of shapes and sizes (200 lbs. to 5,000 lbs.) in alloys to meet the extreme demands of today. They may be supplied as forged, rough machined, or finish machined, ready to save money on final operations. It is now possible to take advantage of the many benefits offered by high grade alloy ferrous* forgings in applications never before possible. Investigate these advantages. Write or call . . .



* ferritic or austenitic

ONE-TON TEST

proves physical strength of
"Integrated" field coils

in
ALLIS-CHALMERS
MOTORS



It's not likely a field coil of a motor would ever be punished this way. But tests like this illustrate the inherent ability of Allis-Chalmers "INTEGRATED" FIELD COILS to withstand the stresses created by the most severe loading conditions of a motor.

Available only on Allis-Chalmers Motors

"Integrated" field coils, available only on Allis-Chalmers motors, are enveloped in oriented glass fibers and heat-stabilized resins. These are securely locked to poles to resist mechanical force. High dimensional stability and tensile strength characteristics assure long life under the toughest of operating conditions.

Coils are surface sealed against atmospheric contaminants. In addition, the coefficient of expansion of insulation is similar to that of copper. Heat transfer qualities are excellent. "Integrated" coil structures can withstand the most severe thermal cycling found in normal operation.

Exclusive Allis-Chalmers

"Double-protection," combining new "Integrated" field coils with Silco-Flex all-silicone stator coil insulation, is available for rotating and stationary elements of large ac or dc machines with operating temperatures through Class B range.

For the whole story of Allis-Chalmers motors, contact your local A-C representative or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

Silco-Flex is an Allis-Chalmers trademark.

ALLIS-CHALMERS



NEWSFRONT

More Steel For Roadbuilding

Highway builders let it be known in Washington that the structural steel supply picture is brighter. They say steel's being offered for 14-to-16 month delivery, instead of the 18-to-20 months quoted last fall. Builders view the shortage as temporary; expect the supply problem to be licked by 1959, when new road construction is in full swing.

Liquid CO₂ Checked As Coolant

Recent studies checked liquid CO₂'s efficiency as a coolant in cylindrical grinding of alloy steel. Results show that grinding ratio climbs roughly 1200 pct, if the CO₂ stream is directed onto the work at a slight distance from the point of wheel contact.

New Fire-Retardent Plastic Foams

Maybe you've been considering foamed-in-place plastics core materials. But you've held off using them in filler or sandwich applications because of possible fire hazards in your particular situation. New fire-retardent plastic foams are now on the way, based on research of the past 60 days. Initial gains have been largely in foam densities of 3 to 4 lb per cu ft or higher.

Empties Barge In Two Passes

Hot item in ship-to-shore materials handling: U. S. Steel's Clarendon Works barge unloader. Not much has been said about the unit. But the monster can lug coal out of barges at a 2000-tons-per-hour rate; empty a 900-ton barge in two passes. Helpful feature: string of limit switches which greatly simplify operator's control problem.

Lightweight Engines: Still A Longshot

Despite extensive testing by all major automakers, aluminum engines aren't likely to show up in high-production models for quite a few years. The hedge: Providing there's no sharp change in relative price of gray iron castings or aluminum. Present problems include materials supplies, casting accuracy, tool life, other production difficulties of minor nature.

Emphasis Shifts in Brittle-Failure Studies

The researchers' approach to analyzing brittle failure in mild steels is beginning to shift emphasis. Less attention is being paid to the fracture itself; tracing the basic causes of fracture is drawing far more attention. One highlight of recent research links brittleness with work-hardening characteristics, in attempting to improve fracture resistance.

Crankshafts: Cast or Forged?

Unconfirmed rumors have it that Pontiac will change back from a cast to a forged crankshaft in '58 models. Insiders don't interpret this as any reflection on cast quality; see it rather as another sign of the seesaw price situation between cast and forged crankshafts. Merry competitive race between the methods will continue, experts feel. So will back-and-forth switches.

Tests Spot Plating Porosity

Two new radiographic tests have been developed for detecting porosity in electroplated coatings. Both are non-destructive. Simplest-to-use method uses an external source of radiation, like that produced by an X-ray machine. Both tests are sufficiently sensitive to spot pores, pits as small as 0.001-in. diam.

Aluminum: Machinability Data Due

Although aluminum's generally regarded as one of the easier machining materials, some producers are probing deeply to correlate and classify machinability-of-alloys data. New alloys keep cropping up to outpace machining information. Aim is to predetermine properties, machining effects. Bar stock alloys for screw machine products are getting heaviest initial attention.

Further Arguments For Automation

If you wonder why automation is gaining ground so rapidly, here's one very good reason. Engine plants have learned that automation increases equipment utilization by anywhere from 60 to 80 pct. That's a clear gain in production capacity without anywhere near a corresponding investment or plant expansion.

How to make your automatic heat-treating and hardening even more automatic ...at no extra cost

FAST, continuous operation is the key to profitable automatic forging production lines. Especially in high speed heat-treating and hardening operations. They're extremely sensitive to changes in chemical composition and structure of steel used. Interruptions to make tests or adjustments slow production, increase costs, reduce the advantages of automatic operation. This makes the uniformity of the steel you use an even more vital factor. The more uniform the steel, the steadier the production and the greater the potential you can realize from your automatic equipment.

You can get the utmost in uniformity, and automatic operation—at no extra cost—by using Timken® fine alloy steel. Uniformity is constant from bar to bar, heat to heat, order to order.

We take many extra quality-control steps to assure this uniformity. For example, the Timken Company uses a magnetic stirrer for

molten steel to assure equal distribution of alloys, uniform temperature and improved working of the slag. It's the first installation of its type in the United States.

To further assure uniformity, your order of Timken fine alloy steel is handled individually. We target our conditioning procedures to meet your end use requirements. Each bar is stamped to identify the heat it came from. This limits variations within an order as well as from order to order. And every heat is examined spectrometrically to insure uniform grain size.

To make your automatic heat-treating and hardening operations even *more* automatic—at no extra cost—always specify Timken fine alloy steel. You'll get money-saving performance and uniform results every time. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

TIMKEN STEEL

*Fine
Alloy*

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING



How To Build Your Skilled Labor Force

The problem of training well-rounded craftsmen can be solved . . . However, organizing and running apprentice training programs take careful planning . . . Metalworking favors them—By P. J. Cathey.

◆ "TODAY craftsmen need greater and more well-rounded skills than ever before because the machines and structures we build and use are more complicated . . . many of today's electricians will have to learn electronics.

"Pipe fitters may have to learn hydraulics. The man who once measured with calipers is now measuring with micrometers, and soon may use light waves."

That's the way Labor Secretary James P. Mitchell sees the impact of technology on our labor force. It's clear, he says, that scientific and engineering advances *increase*, rather than *decrease* our reliance on trained craftsmen.

And the problem of finding and training qualified apprentices grows more critical each year.

Our machine tooling needs

alone, says the National Assn. of Manufacturers, will be 50 pct greater by 1970. It's estimated that 8000 apprentices must begin training every year from now on just to meet the requirements of the tool and die industry.

The Trend

Happily, there's an upward trend in the number of registered apprentices employed in the U. S., according to the Dept. of Labor. This year there are about 200,000 compared with 158,000 in 1953.

While the U. S. requires several hundred thousand new skilled workers a year, only about 50,000 apprentices graduate annually from programs registered with the Dept. of Labor. Others came from non-registered programs, trade schools, and the armed forces.

The Labor Dept. proposes to swell the nation's pool of skilled workers by a program of:

Joint cooperation by labor and industry to improve training

Improvement of government services in connection with apprenticeship, the study of labor requirements, support of vocational and other educational programs, and operations of the federal-state employment system.

Selling of industry on providing workers with an opportunity to learn skills while they work.

Community action to improve vocational guidance services.

Through its Bureau of Appren-

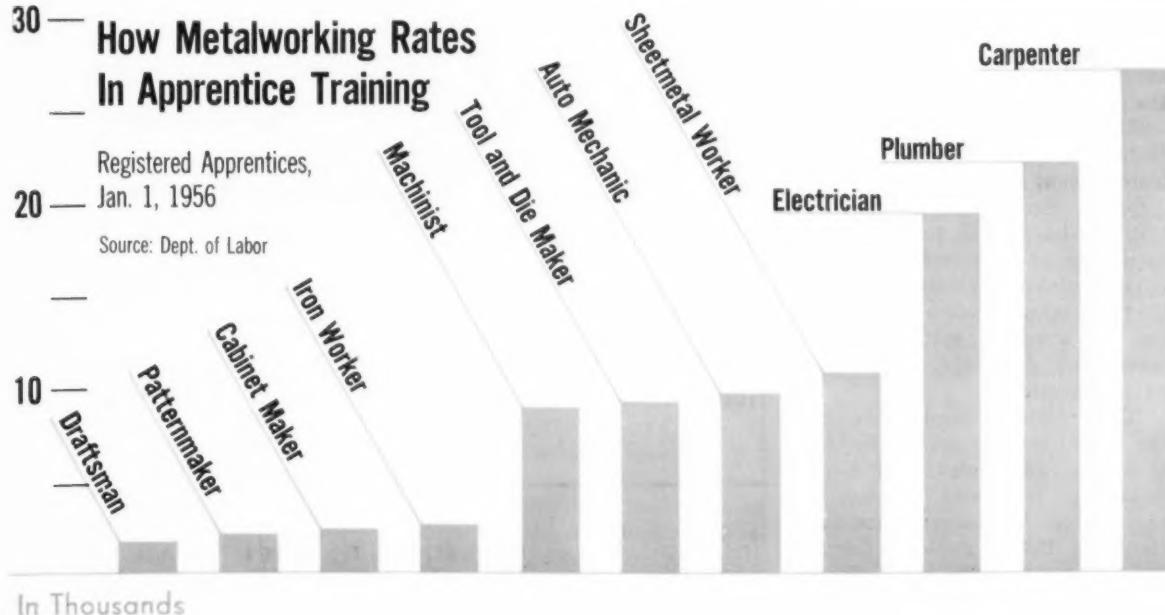
"You Arbitrate It"
a new feature series,
P. 140

30—How Metalworking Rates In Apprentice Training

Registered Apprentices,

20—Jan. 1, 1956

Source: Dept. of Labor





APPRENTICE PERFORMANCE DISCUSSIONS such as this are important part of Brown & Sharpe Mfg. Co's program.

SPECIAL REPORT

Apprenticeship and Training, the Labor Dept., will help companies develop, expand, and improve training programs. Its field staff, with offices in every state, has the experience to solve varied training problems.

No Pat Answer

"There's no packaged solution for sound training; each job requires a detailed analysis of its particular production problems," says Joseph D. Dolan, Area Supervisor for the Bureau in the Philadelphia metropolitan area.

"Some of the questions which must be answered are:

What specific knowledge does the job *really* require?

What technical techniques must be learned?

What is the best pattern to follow in bringing the trainee up to the job's demands?

What about the trainee himself? Is he suited by intelligence and temperament for the assignment?"

Dolan recommends that (1) training be geared to changing conditions and production needs, (2) established as closely as possible to actual productive situations, and (3) aimed at getting acceptable work from the trainee as soon as possible.

"Our training program has been the key to the successful staffing of our expanding plant with competent and interested personnel," says Horace W. Rodgers, General Manager, Beloit Eastern Corp., Downingtown, Pa. The firm—which supplies heavy machinery for pa-

per manufacturers—decided on a major expansion program in 1955. At that time there were 285 employees; today there are 682. In less than a year, Beloit trained 52 workers as machine operators.

What makes a sound training program? Here's what the Federal Committee on Apprenticeship says it should include:

A schedule of work processes in which the apprentice is given training and job experience.

Organized instruction—a minimum of 144 hours per year.

A schedule of wage increases.

Proper supervision of on-the-job training as well as adequate training facilities.

Regular evaluation of the apprentice's progress, both in job performance and related instruction.

Maintenance of training records.

Recognition of successful completions of training.

How Metals Fare

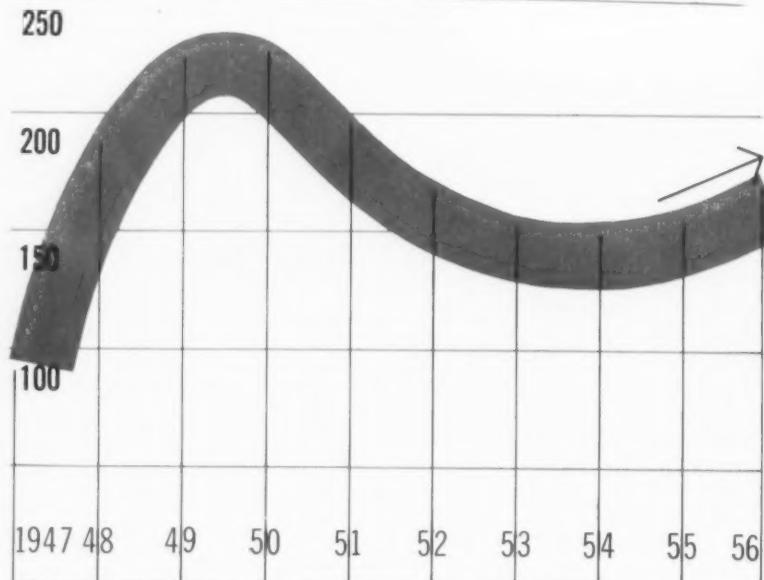
How well do steelmakers and metalworking firms with programs measure up to these requirements?

Apprentice training has a long history in the metals industry. Bethlehem Steel started it about 50 years ago, Armco about 40, and U. S. Steel's programs date from the end of the first World War.

Apprentices: Too Little, Too Late?

Thousands of Apprentices in Training

Source: Dept. of Labor



Among the machine tool builders even these records are beaten. Brown & Sharpe began training in 1848. Warner & Swasey, where the founders were both former apprentices, started in 1880. Cincinnati Milling has trained since 1884.

Thirty-five metals firms were questioned about their programs in a recent American Iron & Steel Institute survey on apprenticeship. All the steel firms met or exceeded the minimum of 144 hours of organized instruction. Wages to apprentices are standardized in iron and steel.

The subjects taught trainees vary. Here's a sample as outlined for **THE IRON AGE** by Brown & Sharpe:

"In addition to shop work, each apprentice receives regular classroom instruction in geometry, trigonometry, threads, gearing, cams and other related subjects. Special courses in foremanship, electricity, precision measuring, hydraulics, heat treating, metallurgy and strength of materials are also part of the classroom program. In addition there is a series of lectures by company executives on the firm's history, organization, production methods, machine design . . . and other subjects."

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept. THE IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.



Warren & Swasey Co. photo

PERSONNEL

WORKERS: Age Has Advantages

Don't sell the older workers short . . . Many common reasons for not hiring them are invalid . . . In the future, more companies will turn to this group for help.

- ◆ BETTER FIGURE the older worker in your long-range planning.

The plight of the older worker who can't find a job because he is considered too expensive a risk by industry is a common one today. Yet the day seems not far off when personnel men will be pressing management to abandon restrictive age ceilings.

The reason: there will be more competition for skilled labor in the next 10 years than ever before. The age group 25-34, which industry has traditionally relied on for recruiting its solid core of skilled help, is expected to decrease by 34 million in the coming decade. The low birth rate during the depression is beginning to tell.

A Dept. of Labor study reveals that although the total labor force will increase 10 million by 1965, the increase will be made up of workers 25 years and under—who are generally inexperienced—and workers over 45.

Expensive Luxury

"This means that industry will have to revise present personnel policies which today keep many workers over 45 from making full use of their abilities," says Labor Secretary James P. Mitchell. "It's a prejudice industry can no longer afford."

While workers 45 years old and over comprise about 40 pct of the job seekers today, they obtain only 22 pct of the jobs filled. For women workers, the disparity is even higher.

The most common reasons given by employers for refusing to hire older workers, or for laying off senior employees, lack validity, according to the study.

The excuses most commonly heard: "inability to meet produc-

tion standards," "inability to meet physical requirements," "lack of flexibility to meet changing conditions," "pension and insurance costs," and "too close to retirement age."

But the study, which was made in seven major U. S. cities, showed that management is overlooking some vital facts.

Stable Influence

Older workers are stable, they waste less time on the job, have a serious attitude toward their jobs, and a sense of responsibility and loyalty to their employer. Once oriented, an older worker usually requires less supervision and is less distracted by outside influences, according to the Labor Dept. study.

One employer who has seen the light reports that he would like to have at least one older worker in every working group because of the "stabilizing influence his presence has on the group." He called this "unconscious supervision."

Frequently, the older worker is his own worst enemy when looking for a new job. If he has had lengthy work experience with one employer, often he does not know how to go about looking for a job.

Many older workers do not realistically evaluate their own limitations. Some tend to make unduly high demands as to wages, location, working conditions, and the like. And on the other hand, some tend to undersell themselves.

Personnel men will have to take these things into consideration when interviewing older workers. The recruiting job will require more guidance, more understanding. But industry will have at its disposal a pool of labor that for a long time has been wrongfully neglected.



INSPECTING borazon are Nobel prizewinners Dr. Percy Bridgman, left, and Dr. Irving Langmuir, right. Discoverer Dr. Robert Wentorf, second from right, and Dr. Herbert Strong of GE demonstrate characteristics.

BORAZON: Hard As Diamond

GE discovers new material . . . Its hardness and resistance to temperature indicates a wide range of industrial uses and applications . . . Material is cubic boron nitride.

• A NEW MATERIAL, as hard as diamond and able to withstand much greater temperatures, has been discovered by the General Electric Research Laboratory.

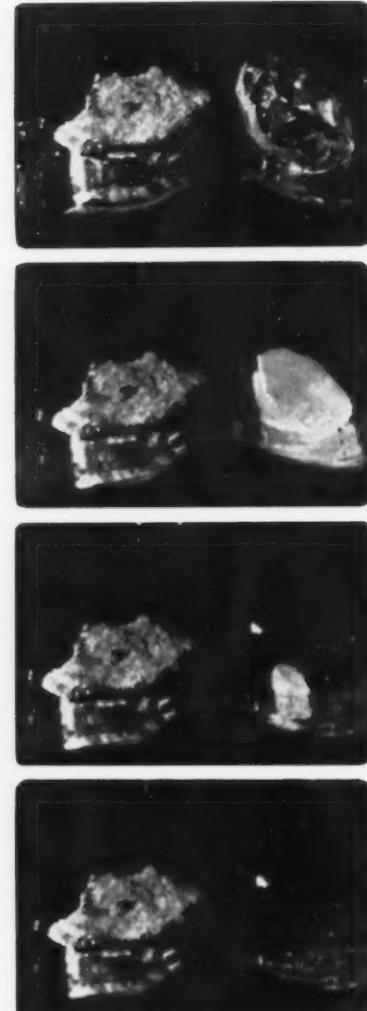
The material, cubic boron nitride, is called "Borazon." It is hard enough to scratch a diamond. In lapping tests, borazon powder ground away a measured diamond as rapidly as diamond dust.

Borazon's value in industry lies in its resistance to heat. Unlike diamond, which is basically carbon, borazon can withstand temperatures of more than 3500°F. Diamond burns up at about 1600°F.

The material's resistance to oxidation will be of industrial value in permitting better methods of mounting stones in industrial tools. It will also allow wheels and bits to be operated at higher speeds.

First exhibited by GE this week, the substance was discovered by Dr. Robert H. Wentorf, 30-year-old Schenectady scientist.

GE is now in pilot production on man-made diamonds at its Metallurgical Products Dept. Similar techniques, combining tremendous pressures with high temperatures, were used to produce crystals of boron nitride.



SEQUENCE shows how diamond gem stone at right burns at 1600° F while borazon is not affected.

Ordinary boron nitride is a white solid material similar to black graphite. Superpressures above 1 million psi and temperatures over 3000°F are used to produce the crystals.

First borazon to be exhibited consists of tiny crystals no larger than grains of sand. But even in this form the material is expected to be suitable for a variety of industrial uses, according to Dr. C. G. Suits, GE vice president in charge of research.

He says the discovery of borazon "can have far-reaching impact on industrial processes."

Controls:

Ike threatens, but controls are unlikely.

Controls over consumer credit and prices, and allocation of scarce materials, are not in the cards.

Not now, and not in the foreseeable future.

President Eisenhower's stern threat, that unless business and labor heeded his call for restraint in price and wage hikes to curb inflation, "controls of some kind" would have to be imposed, is just that—a threat.

While it is not entirely an empty threat, it is designed to prove that he is seriously alarmed at the present super-buoyant economy.

Administration Agrees

While it is conceivable that should the wage-price spiral get completely out of hand, the President would be forced to seek Congressional authority to impose strict controls, it is highly unlikely. Natural balancing forces would take the edge off before that.

The president says strict economic controls of this type are "onorous" to him. They are. And to most of the rest of the administration as well.

No sooner had the President issued his warning, than Commerce Secretary Weeks took the edge off by explaining that there are now no plans and "no disposition" to impose controls. So as not to remove the "moral suasion" value of the original presidential threat, the Secretary added that "you can never guarantee what you're going to do under a given set of circumstances."

Reason for the outburst of threat and reassurance is simple—business is humming, but inflationary pressures have pushed wage increases past the point of rises in productivity in some industries, according to Mr. Weeks.

In addition, any call for altruistic actions on the part of business and management to refrain from wage and price hikes is almost naive. The President knows this. So he put some teeth in his bid for "self-discipline."

GOVERNMENT

TAXES: Industry Overpaying

Industry is paying more taxes than it should due to underdepreciation . . . Problem becoming more acute . . . The pressure for action again building up steam.

- AMERICAN industry is paying taxes on something like \$6 billion of capital consumption because of underdepreciation.

"This is a curious state of affairs in a country as devoted as this one to the idea of progress, economic expansion, and rising standards of living," says the Machinery & Allied Products Inst.

"For the taxation of capital consumption as income is not only inequitable, it has one certain effect: the retardation of progress through curtailment of the funds available for capital investment."

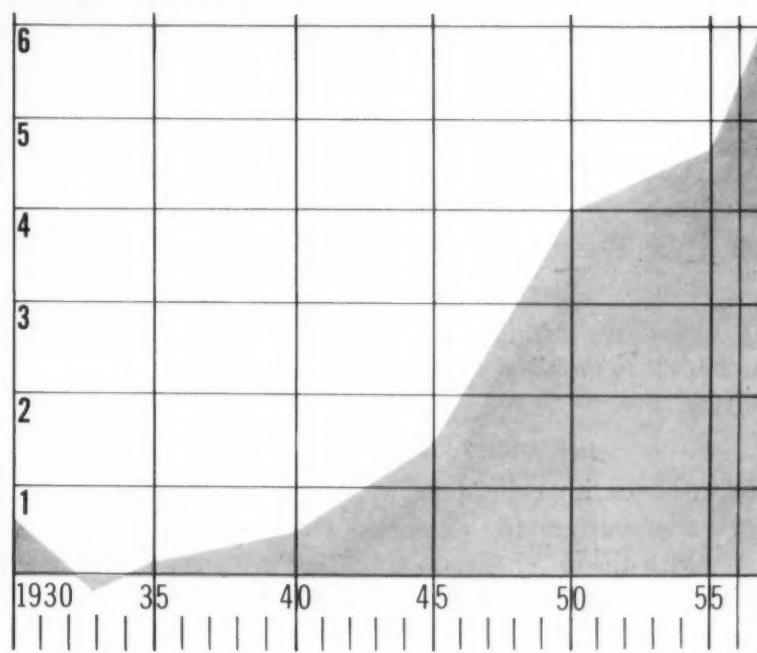
MAPI warns that the problem of underdepreciation "cannot be waved aside. It is not going away. On the contrary, the deficiency of

historical-cost depreciation is greater today than ever."

MAPI points out that management interest in the underdepreciation problem is reviving after 10 years of hopeful waiting for a reversal of the inflationary trend that began after the war. Management awareness is particularly acute in those industries that built heavily under the impetus of Certificates of Necessity.

"The decline of capital-recovery deductions accompanying the completion of amortization on these facilities . . . will entail a sharp increase of income tax liabilities and a corresponding decrease of internally-generated capital funds," adds MAPI.

How Current-Price Exceeds Historical-Cost (billions of dollars)



Source: Machinery & Allied Products Institute.

DIVERSIFICATION: How To Make It Work

L. A. Young was caught in auto supplier squeeze . . . Diversification is already paying off . . . But it took thorough planning . . . Here are some pointers based on this company's experience in changing over.

◆ SINCE THE END of World War II, the position of automotive suppliers has grown more and more critical.

The number of companies manufacturing auto parts has steadily dwindled. Some have just gone out of business, merged with other companies, or diversified to the point where they are scarcely recognizable in terms of their former status.

Frank Rising, secretary of the Automotive Parts Manufacturers' Assn., estimates that in the past five years at least 40 to 50 parts suppliers have either merged, acquired other businesses, or disappeared from the business scene.

The reason? Automotive companies, themselves, are producing more of their own parts. This

trend to integration has made competition among vendors, already cutthroat, even more intense. Suppliers were caught in a profit squeeze and a dwindling market.

An obvious solution is diversification. But many companies seeking this way out found it a difficult solution. There are many pitfalls to be avoided. It takes imagination, thorough planning, and adequate financing.

L. A. Young Spring & Wire Corp., Detroit, is an example of a successful diversification program. In a relatively short time, the company has broadened its activities to the point where it now has five separate divisions.

Through most of its 50-year history, L. A. Young was a successful

manufacturer and supplier of upholstery and mechanical springs, as well as interior window moldings, for the auto industry. In addition, it makes springs for the furniture industry and coat hangers.

Far and Wide

But with the bulk of its business concentrated in automotive accounts, the company was one of those behind the eight ball. In 1953, the company made the move to diversify.

It made its first acquisition in March, 1954, with the purchase of the Daybrook Hydraulic Corp., with plants in Bowling Green and Sandusky, O. The company had a good reputation as a volume producer of steel dump truck bodies, hydraulic hoists and power tail gates for farm and commercial vehicles.

But the company didn't stop there and by the end of 1956 had acquired five more companies in five different states.

Qualifications Needed

None of these companies was acquired in haphazard manner. L. A. Young had a definite plan when it started to diversify. Any companies purchased had to meet certain specifications:

There had to be an end product that was handled through a distributor or dealer organization.

The company also had to have a definite growth potential. The best examples of this are purchases in the electronics and guided missile fields.

In addition, the companies had to have a young and aggressive management that was willing to stay with the firm. This is one of the prime requirements. L. A. Young feels strongly that it is

An Executive Looks At Diversification

Says R. B. Robins, vice president-marketing, L. A. Young:

ABOUT PITFALLS:

"A company has to have a plan. You can't run all over the lot looking for businesses. If you don't know where you're going, you'll never get any place."

KEEPING GOOD PERSONNEL:

"It isn't things that make a company successful or cause it to sink. It is **people** who develop the things a company has to offer. People are a company's greatest asset."

IMPROVING ORIGINAL BUSINESS:

"As we added other divisions, we strengthened the company. Take engineering, for example. New people bring fresh ideas with them. These are combined with the experience of seasoned engineers. The result is higher standards and better products."

people that make companies either good or bad.

Lastly, where possible, a company had to be engaged in some form of metalworking, the field with which L. A. Young is most familiar.

Showing Profits

All of the present divisions are operating profitably and the parent company is still looking.

At the same time, the company is not neglecting its automotive business, but will continue to expand it as much as possible.

The diversification program is headed by R. B. Robins, L. A. Young's vice president in charge of marketing. It is his job to seek out new companies and investigate and analyze them.

Thereafter, exhaustive studies are conducted by independent economic consultants. Final decisions are made by a management team headed by N. D. Ely, company president. It's a slow process. For example, it took 15 months before the Gonsett Co. was finally purchased.

The objective of the program is to boost sales volume to \$100 million by 1960. This is double the figure for the fiscal year ended last July.

So far, the program is paying off. Earnings as of July 31, 1955 were equal to 40 cents per share. For the same period in 1956, they were equal to \$3.50 per share.

In addition to Daybrook, these are the companies acquired by L. A. Young in the first two years of its diversification:

1. Ottawa Steel, Inc. of Ottawa, Kan., a manufacturer of hydraulically operated tractor-loader equipment.

2. Tracto-Lift Co., of Kansas City, Mo., producers of heavy duty fork-lift trucks for outdoor use.

3. Woodside Power Loader Div. of Woodside Industries, Milwaukee. The principal product is hydraulic power loaders which can be installed on standard truck frames.

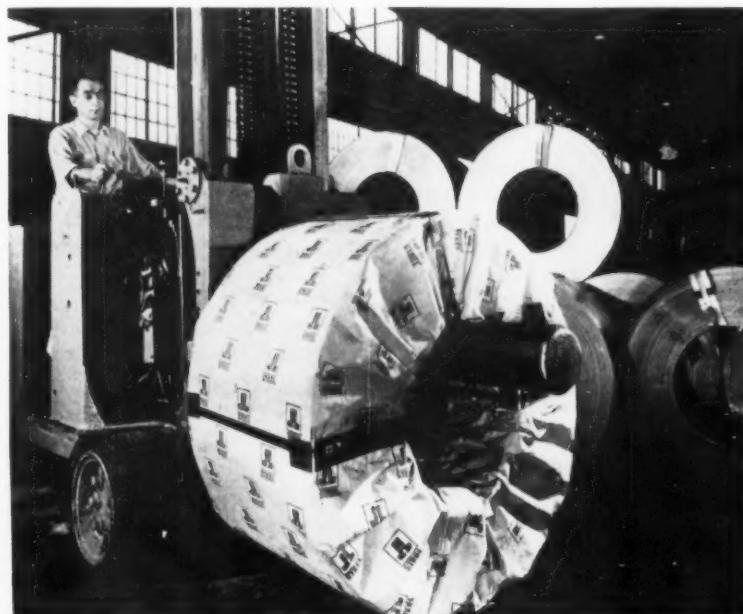
4. Gonsett Co., Inc., of Burbank, Calif., a producer of communications electronic equipment.

5. Extruded Hinge Co., of Ypsilanti, Mich., a fabricator of continuous hinge and hinge-type connector sections for aircraft.

PACKAGING

LABEL: Recognition for J & L

Trademark and packaging program win award for steel company... New symbol is model for industry... Emphasis on product identification grows in basic industry.



THERE'S no mistaking Jones & Laughlin coiled sheet with the new label.

♦ YOU KNOW what's in a name; are you slighting the importance of what you do with it? You're proud of your trademark; be sure your public knows what it stands for.

This has been elementary in consumer industries for years. But capital goods producers have often figured that these considerations were frills, not needed in their business. Now, however, there are signs of new attention to product identification among heavy industry.

A big boost to the trend comes this week when Package Designers Council awards two first prizes jointly to Jones & Laughlin Steel Corp. and industrial designer Gerald Stahl. Prizes are for 1956's best coordinated design program and the best industrial packaging program of the year.

Heart of the prizewinning pro-

gram has been the steelmaker's new trademark. The new mark has meant a complete revision of corporate identification, from trucks and river craft to letterheads and shipping tags.

Avoid Confusion

The company started its program because it felt that the existing trademark was too old-fashioned for an up-to-date organization. And the old design was not particularly outstanding or unique, was cluttered by the ampersand. Further, the old mark appeared in a wide variety of type styles, without consistency.

Confusion with other companies is far from rare. A recent IRON AGE survey for another steel company reveals that (1) most people didn't recognize the trademark at all, and (2) many confused it with two entirely different companies.

PLASTICS: A Big Lift From Aircraft

Reinforced plastics may be the answer to some of aircraft's big engineering problems . . . New products show surprising heat-resistance qualities . . . Use grows, but there are plenty of problems.

• AIRCRAFT that attack at twice the speed of sound mean higher operating temperatures. And ultra-temperatures are sending aircraft builders searching for an ultra-material.

Reinforced plastics, fiberglass matting coated with plastic resin, may be an answer. Aircraft research is evolving it into what is virtually a new material; one that will certainly find other uses in fields where corrosion and temperature figure into the annual statement of profit and loss. It's already opening new vistas to enthusiastic design engineers.

Overlays of reinforced plastic-

on-metal, though it's hard to believe, are withstanding 10,000°F temperatures, but for only brief periods. But the development is confounding many who've regarded plastic as a low temperature material. Erosion of a heated plastic surface has been controlled even to temperatures at which the plastic casting begins to burn.

Takes Heat

Reinforced plastic is being used in guided missile fins, in aircraft motor liners and control surfaces, even in firewalls where it is exposed to temperatures of 4000° to 5000°F for short periods. A plastic

part can stand up as long as one minute in that kind of heat, while exposed to the kind of aerial erosion it would receive in an aircraft moving at four to five times the speed of sound.

Some Applications

A plastic radar dome for high speed aircraft will stand 500°F for 200 hours and retain its strength. Phenolic resins, cured with recently developed techniques, will withstand 750°F temperatures. Silicone resins in reinforced plastic sheets will withstand 2000°F for 15 minutes without burning through or breaking into flame. Outside the aircraft field, a producer of plastic sheet for curtain wall buildings, in testing his product, failed to burn through a sheet in 1.5 hours at 1880°F.

An aircraft engineer told *THE IRON AGE*, "We are currently figuring reinforced plastics as having a weight-to-strength ratio about comparable with aluminum. Admittedly, there's a lot of opposition to increased use of reinforced plastic in aircraft. That's Old Guard thinking. We'll be using more reinforced plastic per plane next year. So will everybody else in the industry!"

The statement, from an aircraft industry source, is important. Aircraft used 20 pct of the 140,000,000 lbs of reinforced plastic consumed in the U. S. in 1956. The total was 30 pct higher than 1955 use, will rise by another 30 pct in 1957. Building construction used 16 pct of 1956 output and boats another 16 pct. Aircraft men are careful to point out that reinforced plastic is not used structurally, many will not use it in areas in which it will be exposed to temperatures exceeding 350°F.



EXAMPLE of growing use of reinforced plastics is this center section mold for a 225-gal plastic fuel tank. Developed at Molded Products, a division of Admiral Corp., mold is in sections for varying sizes.

Tin Market:

ITA has no metal, can't enter the market.

The buffer stock of the International Tin Agreement has plenty of money, but no tin. The result: it will be a long time before it can enter the tin market.

One New York tin broker believes the possibility of ITA influencing the market before the summer of 1958 is "extremely remote." Original schedule was late March, or early April 1957.

The trouble stems from the very thing the group was organized to prevent—out of line prices. Since the Suez controversy world price has been flirting with a record peacetime high.

Goal Is Half Of Each

Producing members of the ITA are assigned quotas of metal, based on their percentage of world output, which they must contribute to start the buffer stock. They may substitute money for any part of their quota. The goal is a buffer stock of half money, half metal. The manager may then buy and sell tin on the open market to balance demand and supply, and thus the price range.

However producers need only send cash at rate of 80¢ per lb. Since market price is much higher everyone is selling metal on the market and sending money to ITA.

Buffer stock manager W. K. Davey says he now has close to \$28 million, and not one pound of tin. Contributory period ends March 15. Executives of the group admit it is unlikely they will get any metal.

The general council of the ITA will meet March 20 to consider the problem. Close observers say the question of boosting the price at which the buffer manager may sell tin from his stock will get more attention.

At present Mr. Davey could sell tin (if he had any), at \$1.00 per lb., and must sell at \$1.10. This is aimed at keeping the price from getting out of hand.

Word is Bolivia, highest cost producer, will ask for the change. The tin industry is betting she won't get it. (See page 182.)

MARKETING

TEAMWORK: Sells New Products

When considering a new product line, a company should weigh its marketing setup . . . All efforts must be coordinated . . . High selling costs drain profits.

• MARKETING should be among the first things considered by any company planning to diversify its product line.

The real areas of doubt lie in selling a new product, not in making it. And in order to market a new product, you must have teamwork.

These were the opinions of two executives who addressed the American Management Assn.'s annual marketing conference in New York.

"You can't just buy 'em and walk away," warns Willard F. Rockwell, Jr., president, Rockwell Manufacturing Co.

Look Before You Leap

"Expansion into areas where we cannot market economically can be disastrous," he continued. "Look to areas where you can operate profitably on a stable foundation."

But new products need not use the same distribution channels as existing ones. For best results, distribution should be fitted to the product, not vice versa.

Before taking on a new product a company should analyze its sales staff to see if available talent can be adapted to the product.

"I suspect all too many management search furiously for product lines that meet the utopian goal of 'adding volume and cutting costs' without taking inventory of the sales talent at its disposal."

New Product Planning

Once the new product is judged worthy, teamwork is needed to put it across.

According to Ralph Winslow, Koppers Co. vice president, lack of authority is usually the staff executive's biggest headache. But

Koppers' marketing staff finds its real problem is supplying all the help asked for by operating divisions.

Product planning is regarded as one of the most critical steps in the whole marketing process. After a new product is okayed at Koppers, a 5-year marketing program is set up. The plan includes scheduling, sales, advertising, sales promotion, public relations, and personnel training.

All these steps should be weaved into a plan specifying exactly who will do what, when, where, and how.

Teamwork for such a marketing setup is best achieved, Mr. Winslow suggests, by placing all staff marketing specialists in a single department.

"Only when they work together day after day do we have the best insurance that talents will be pooled," he said. Integration of the marketing department into overall company operations is done by means of management committees.

Marketing men sit on the operating and appropriations committees. The marketing committee in turn is made up of the general sales managers of all operating divisions plus the heads of the staff production and research departments.

It was emphasized that marketing heads should play a major role in making diversification policy, as well as in carrying it out.

If taking on a new product depends on the wants of a particular customer, a careful study should be made of that customer's needs by market research, research and development and field salesmen. Only then should management's objectives be considered.

ABRASIVES: Who Buys Them?

IRON AGE survey discloses motor vehicle, steel works and rolling mills top grinding wheel markets . . . Together they account for almost one-third of sales.

♦ THE MOTOR VEHICLE industry, and steel works and rolling mills are far and away the biggest users of abrasive wheels.

Together these two market classifications purchased nearly one-third of the 1955 U. S. abrasive wheel market total of \$160,793,607.

In sales of abrasive belts and disks, the motor vehicle industry is again far in front. This group purchased \$19,272,741 of these products of the entire market of \$68,591,341. Second largest user of coated abrasive belts and disks was the aircraft engines and parts industry, with purchases of \$8,426,702.

These are some of the facts disclosed in a new industry survey by the Market Research Div. of **THE IRON AGE**.

Other major markets for abrasive wheels are ball and roller bearing makers, who bought \$10,928,934 worth in 1955; aircraft engines and parts makers who invested \$9,187,210.

Compiled by more basic market classifications, machinery makers bought most grinding wheels, fol-

lowed closely by primary metal, and transportation equipment industries. Spending of these three totaled \$138,323,397, more than three-fourths of grinding wheel sales.

Anchored by motor vehicle and parts spending, the transportation equipment industry was the big factor in coated abrasives belts and disks sales to the nine basic metalworking markets. It accounted for \$34,519,185, just about half the market.

Other Big Markets

Other major metalworking consumers of grinding wheels include: gray iron foundries, \$5,582,050; malleable iron foundries, \$2,792,668; steel foundries, \$6,392,191; nonferrous foundries, \$1,749,648.

Stampers, non automotive, \$2,845,452; internal combustion engine makers, other than aircraft and auto, \$4,544,610; cutting tools, gage and diemakers, \$6,325,717.

The aircraft industry is one of the few markets which buys more coated abrasive belts and disks than wheels.

Who Uses Abrasives? (1955 Purchases)

INDUSTRY GROUPS	GRINDING WHEELS	ABRASIVE BELTS AND DISKS
Ordnance	\$ 1,013,380	\$ 496,172
Metal Furniture	303,622	1,305,681
Primary Metals	43,060,930	7,195,377
Fabricated Metal Products	14,572,545	10,890,934
Machinery	54,977,377	8,687,348
Electrical Equipment	4,475,193	3,177,588
Transportation Equipment	40,285,090	34,519,185
Instruments	1,209,621	569,165
Misc. Metal Products	905,689	1,755,631
TOTAL METALWORKING	\$160,793,607	\$68,591,341

Source: Iron Age Research Div.

Stainless Hits High

Stainless steel production reached an all-time high in 1956. Production of all types of stainless steel ingots was 1,210,569 net tons reports the Committee of Stainless Steel Producers, American Iron and Steel Institute. This compares with the 1,161,177 net tons turned out in 1955.

One reason for the gain was a big fourth quarter of 360,823 net tons, an increase of 13.5 pct over the same period in '55. Last quarter production was also above the previous all-time-high quarter—the first three months of 1956.

Products in increased demand in 1956 were the chromium-nickel types (61.2 pct of total production), and the low-nickel stainless steels.

U. S. Plans Ore Study

The government may study ways to expand uses of iron ores and lignite. There's talk in the Congress of requesting such a study of the Office of Defense Mobilization.

If present plans win approval of the Senate and the House, ODM will take three months to find new ways for producing concentrated ore for steel from the sources of ore and lignite fuel within the Great Lakes area.

GE Says It's Not So

Wailing Wall Willies thought they had a juicy item in recent press reports of cutbacks by General Electric in its expansion program. But the facts give a different picture.

Queried by **THE IRON AGE**, General Electric spokesmen stress that it is a mistake to call the schedule changes cutbacks. "Shifts in emphasis" is the way GE speaks of the changes. The company points out it is in the middle of a 3-year expansion program which will cost at least \$500 million.

No overall curtailment is involved in the recent changes. When final '56 figures are in, they will show expansion spending of about \$200 million, and plans for this year run over \$170 million. GE reports that at least two of the deferred programs had not even been put up for bids.

*

Quantity
PRODUCTION
of
GREY IRON CASTINGS

*

ONE OF THE NATION'S
LARGEST AND MOST MODERN
PRODUCTION FOUNDRIES

*

ESTABLISHED 1866
THE WHELAND COMPANY
FOUNDRY DIVISION

MAIN OFFICE AND MANUFACTURING PLANTS
CHATTANOOGA 2, TENNESSEE

EXPANSION IN INDUSTRY

SHARON: What's Next Move?

New blooming mill gives Sharon Steel freedom to move in several directions . . . Wide strip or plate mill are possibilities . . . 2 million ton capacity in '57.

• SHARON STEEL Corporation's \$20 million expansion program moved another step forward last week with the opening of a new 44" \$14 million slabbing and blooming mill at the company's Roemer Works.

The new mill gives Sharon an immediate increase in semi-finished products, including stainless, high-alloy and carbon. It increases the plate output of the company by freeing an older blooming mill for plate work. It enables the company to work with larger ingots.

In addition, the mill gives Sharon a new flexibility for future

moves. With 44" slabs now available and provision for future rolling of 60" slabs, there is speculation that the company may be contemplating the installation or acquisition of a wide strip mill. Detroit or Illinois sites are considered likely possibilities for new operations. Another possibility is that Sharon may install a new plate mill. This is of particular interest because there are now no plate mills between Pittsburgh and Chicago.

Built by United Engineering & Foundry, the new mill will increase the ingot rolling capacity of Sharon's Roemer Works to 1.2

million tons a year. Electric furnace facilities now being installed will increase the company's capacity to more than 2 million ingot tons by the end of this year.

Distinctive features of the new mill include two closed circuit television hook-ups to help control ingot handling. General Electric engineers, who supplied motors and controls, say it is the first mill to be designed with an analogue computer.

Slabs coming off the mill pass through a Linde scarifying machine which applies the oxy-acetylene flame to all four sides of the steel at once.

A new battery of soaking pits built by Surface Combustion Co. round out the installation.

More Labs For Timken

The Timken Roller Bearing Co. has ordered steel for a proposed 10,000 sq ft laboratory building in Canton, O. The building will house the company's physical, railroad research, electronic, photographic and lubrication laboratories. Construction is scheduled to start May 1, 1957.

The building will be separate from a new \$500,000 metallurgical research lab which was announced earlier.

Fansteel Fans Out

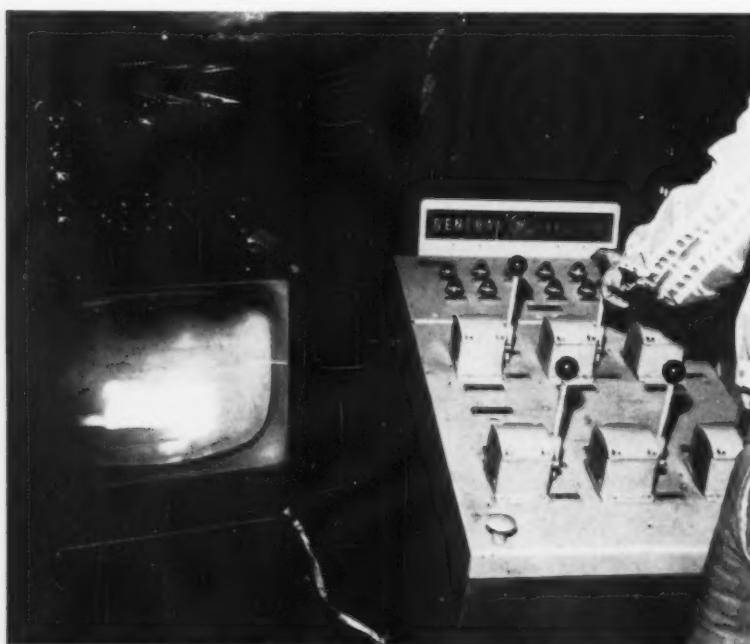
Fansteel Metallurgical Corp. has authorized \$665,500 for new construction at its North Chicago plant. A third story, comprising 24,500 sq ft, will be added to an existing building. It will be used for research labs, pilot plants, offices and a library.

A 21,500 sq ft building will be erected at the South Plant site. It will be used for production of sintered powder metallurgy products.

New Casting Plant

A new investment casting plant is being planned by Austenal, Inc., at LaPorte, Ind. It will consist of a two story office building and a one story production unit totaling 85,000 sq ft. Completion is expected by Sept. 1, 1957.

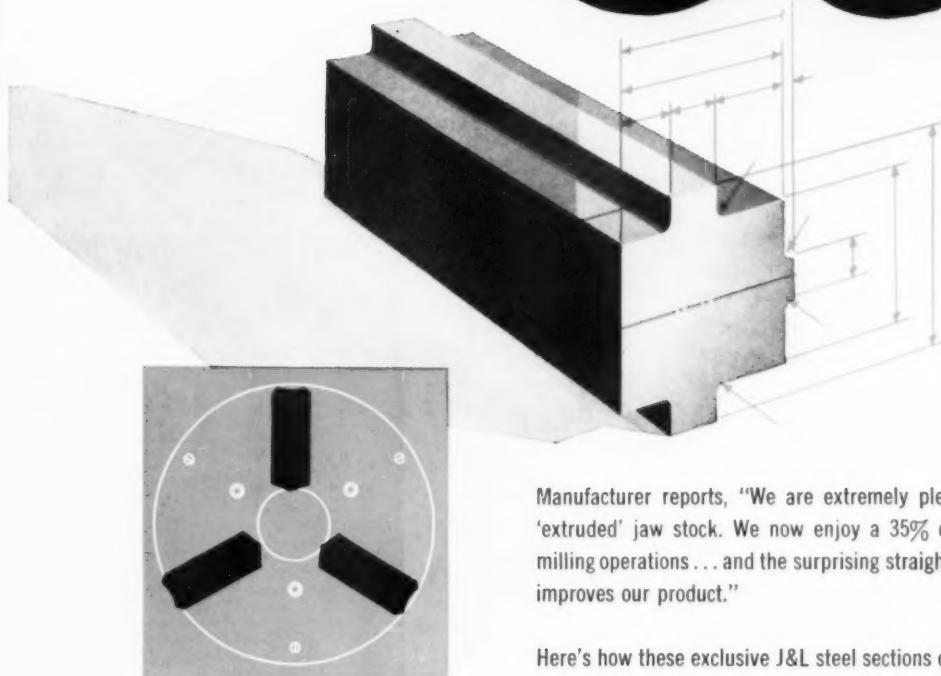
Initially, the plant will employ about 300. An additional 200 acres adjoining the LaPorte site was acquired for future expansion.



TELEVISION screen pictures hot ingots on transfer buggy as it travels over conveyor from Sharon Steel's new and old slabbing and blooming mills.

J&L hot extruded, cold drawn
chuck jaw section reduced milling cost

35%

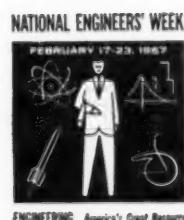


Manufacturer reports, "We are extremely pleased with this purchased 'extruded' jaw stock. We now enjoy a 35% cost reduction on our jaw milling operations . . . and the surprising straightness of the extruded bars improves our product."

Here's how these exclusive J&L steel sections can reduce your costs:

1. Eliminate machining and finishing operations.
2. Reduce scrap losses almost to zero.
3. Eliminate cost of casting and forging intricate sections.
4. Reduce inventories because extrusions are quickly available.

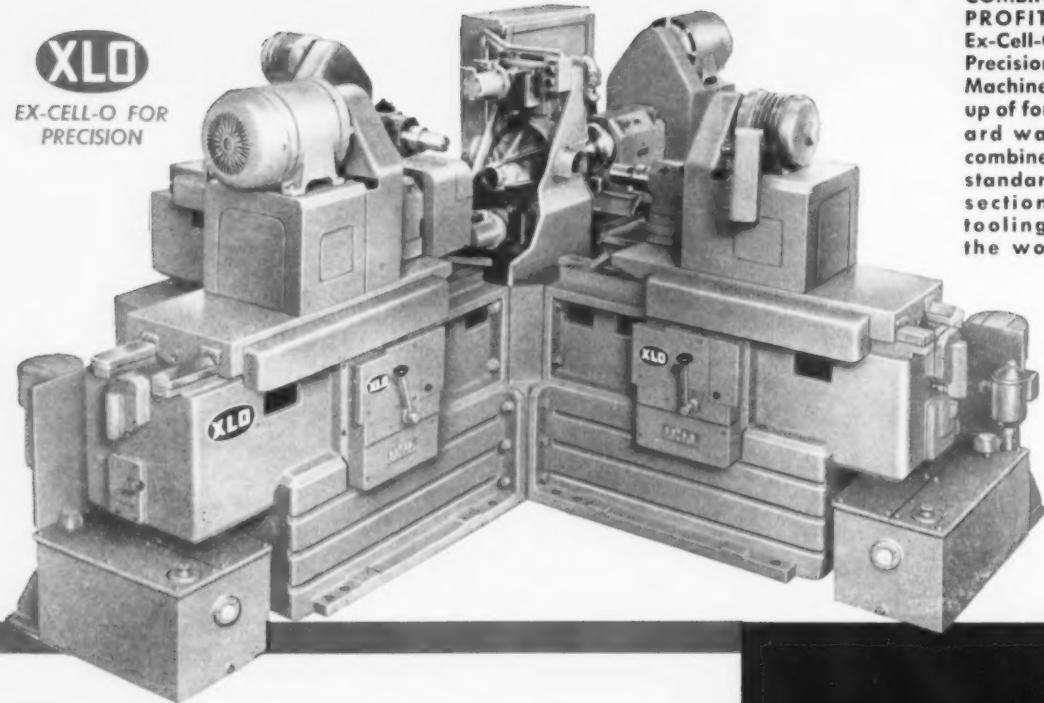
Investigate this new production technique for your shape profiles—within present limits of a design which can be inscribed in a three-inch circle. You'll surely boost production, cut over-all cost. For complete details write to the Jones & Laughlin Steel Corporation, Dept. 403, 3 Gateway Center, Pittsburgh 30, Pennsylvania.



Jones & Laughlin
STEEL ... a great name in steel

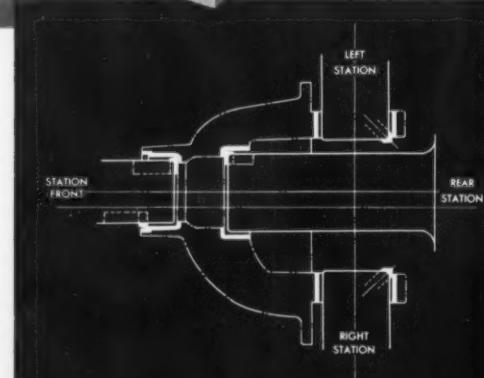
XLO

EX-CELL-O FOR PRECISION



COMBINED FOR PROFITS—this Ex-Cell-O 4-Way Precision Boring Machine is made up of four standard way units combined with a standard center section, with tooling to suit the work.

4 Holes, 90° Apart Bored Simultaneously ON EX-CELL-O 4-WAY MACHINE



SIMULTANEOUS MACHINING of four holes assures a 90° relationship between bearing bores and pinion bores.

This differential carrier assembly requires the boring of accurate holes at right angles to one another. Bore diameters are held as close as .0005". Shoulders must be square with bores. Bearing bores must be square with pinion bores.

Here was an opportunity to combine operations by using an Ex-Cell-O 4-Way Precision Boring Machine, with these profitable results:

FASTER PRODUCTION—machine works simultaneously from four directions.

PRECISION—accurate bores, holding the 90° relationship, are produced by precision spindles, smooth, hydraulically operated slides, and accurate location of the way units.

RELOCATION ERRORS ELIMINATED—since the part is located and clamped only once, there can be no errors caused by relocating and reclamping.

Is there an opportunity to cut costs and combine operations in your product? These way-type precision boring machines, special machines composed of standard units, also are used in automated production lines. They can be placed side by side and connected with transfer type fixtures to form transfer machines, or they can be combined in a transfer machine at those stations where precision boring and similar operations are required.

EX-CELL-O
CORPORATION
DETROIT 32, MICHIGAN

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

REPORT TO MANAGEMENT

These Are Confusing Times

Former President Herbert Hoover has voiced his fear of a depression. It is added to the warnings of others who view with alarm the present status of the economy. As a direct result, the stock market took its biggest tumble in an entire year. This is the kind of thinking that threatens to dominate the business picture.

It's no wonder

if you are confused. If you are, you are not alone. In the midst of the biggest boom in history, financial talk has taken on a marked pessimistic tone. The stock market is down; the scrap market threatens to fall apart. Purchasers, acting on orders from the top, are playing their inventories like an openend straight in a hand of five card stud.

You can ask yourself, what's behind all the pessimism? Chances are, your business is issuing one of its best annual reports. It probably has a backlog of orders and on the surface business prospects are good.

There is a lot to back up one contention that pessimism isn't traced to a series of bad indicators. But there is an absence of good indicators that is causing the pessimism. Without some really bullish guideposts, business tends to lose confidence.

That is one of the troubles of a business plateau, even a plateau at a record high. When business is on a flat plateau, there are bound to be some downtrends here and there. The danger is in being stampeded.

How To Read The Financial Pages

You know that money is tight—has been for some time. But business was able to borrow 11 pct more money in 1956 than it did in 1955. You may not realize that there were more local municipal bond issues last month (January, 1957) than there were in any month of 1956.

Even while he laments that credit controls should be even tighter, William Martin, head of the FED, denies that so-called harsh credit measures have acted against small business, home building, and school and road construction.

But tight money is not going to have a serious effect on the amount of capital spending in 1957. Where business has had to back away, local, state and federal government spending will continue to pick up.

You know the federal picture. Regardless of threats and promises to pare the budget, little will be done to cut defense spending. If anything, it may be increased. Another factor: local government alone spends about \$3 billion more every year.

What About Depreciation?

Next to tight money, depreciation is probably the subject of most concern to business. There isn't much doubt that business, particularly major users of capital goods, needs a more realistic depreciation law.

Business groups everywhere are putting their strongest forces behind an effort to obtain an equitable depreciation law. The turndown of fast-tax writeoffs for the steel industry at least had the effect of focusing attention on this point.

But don't look for any major changes in depreciation laws this year. It's difficult, perhaps nearly impossible, to work up Congressional sympathy for anything that smacks of "pro business" legislation.

You will have to do your best within the existing law. A pointer: Consider the sum-of-the-digits or declining balance depreciation both bookwise and taxwise. If you take one taxwise and not bookwise, some Congressman may decide you are merely using it as a tax device. But one or the other could be worth 10 to 15 pct more than the straight line.

INDUSTRIAL BRIEFS

Good Blend . . . A new company, Reactive Metals, Inc., has been formed by Mallory-Sharon Titanium Corp. and National Distillers Products Corp. The new firm will be engaged in the melting of zirconium and its alloys, and the manufacture of certain zirconium mill products. Physical facilities will be constructed at Ashtabula, O., site of National Distiller's zirconium sponge plant.

Cold Process, Hot Idea . . . Aluminum billets for the extrusion and electrical conductor industries are now being produced in the new direct chill casting plant at Kaiser Aluminum & Chemical Corporation's Chalmette works near New Orleans, La. The casting facility was constructed at a cost of \$1.6 million and is capable of producing 10 million lbs of billets per month. Costly remelt of pig metal is eliminated by the process.

Wonder Bolts . . . Standard Pressed Steel Co., Jenkintown, Pa., has been licensed by Huck Manufacturing Co., Detroit, to manufacture lock bolts made of titanium for the aircraft industry. The bolts will be made out of the lightweight metal—only 57 per cent as heavy as alloy steel. They will permit weight savings in aircraft through size-for-size substitution of titanium for steel lock bolts.

Toast To Pawtucket . . . 1957 marks the 75th anniversary of the Pawtucket Manufacturing Co., Pawtucket, R. I., manufacturers of bolts and nuts. One of the company's specialties is the bolt and nut combination that holds the hardware on wires and poles along railroad tracks. Other products are more specialized, and are designed for unusual work in special pumps, valves and machines.

Back in Business . . . Robert G. LeTourneau, announced that his multi-million-dollar firm will re-enter the earthmoving industry in 1958 after a five-year absence. Machines he will introduce will be driven by revolutionary "Electric Wheels." They will be powered by diesel-electric dynamos similar in principle to those found on modern diesel locomotives.

Breaking Through . . . Sharon Steel Corp., Sharon, Pa., has broken the steam pipe "thermal barrier" with the completion of an order for 400 ingots of type 316 stainless steel. The steel pipe will carry steam at 1200 degrees F. and a working pressure of 5000 psi when Philadelphia Electric's Eddystone Power Plant opens next year.

Check The Calendar . . . Wolverine Tube, Div. of Calumet & Hecla, Inc., will highlight "Discover the Hidden Treasures in Tubing" as the theme of their exhibit at the 13th International Heating and Air Conditioning Exposition to be held in Chicago, February 25 to March 1, 1957.

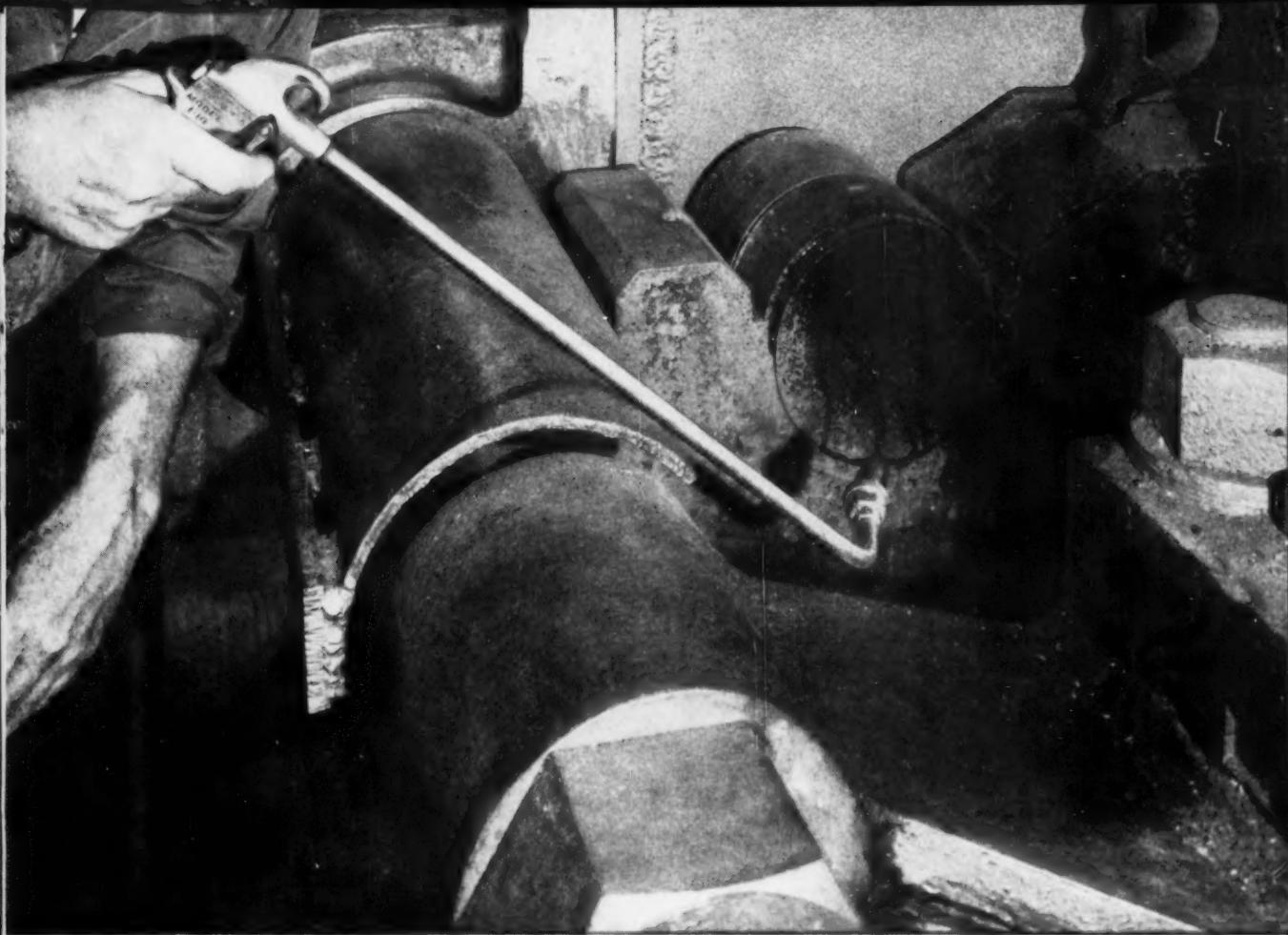
How About 3-D? . . . An organization has been formed by Westinghouse Electric Corp. for the development of Rayescient lighting. First discovered in 1936 by Georges Destriau, French scientist and Westinghouse consultant, electroluminescence provides a two-dimensional, area light source. Light is produced from a coating of phosphors on glass or metal panels when electrically energized. The new light source has been given the trademark "Rayescient" by Westinghouse.

Easy Terms . . . A bill will be presented to the Maine State Legislature, now in session, that would pledge the state's faith and credit to financial institutions furnishing capital to community non-profit industrial development committees that wish to build industrial buildings for well-rated firms. If the bill meets with the support of the legislature and the people, it could become law this year.

Something New . . . A new firm, Hydroforming Co. of America, has been established in Chicago. Hydroforming is designed to cut tooling costs and operates without conventional dies. Low cost tools and quick set-up make it possible to produce a new or experimental part of hydroforming. A variety of materials of different gauges can be formed with equal ease using the same tooling.

Wide Screen View . . . "Make Mine Safety," a new 16 mm sound-color film demonstrating the use of rock bolts in various mine applications, has been made available by The Colorado Fuel and Iron Corp. The film shows the installation and advantages of rock bolts at three representative mines, and the actual production of rock bolts at the Pueblo, Colorado, plant of the CF & I Corp.





'dag' dispersions...a touch does so much!

Extrusion die life lengthened nearly 600%

In extrusion operations many mills have found that 'Aqua-dag'® applied to the die surfaces permits freer metal flow, inhibits build-up of precipitates on bearing surfaces and materially lengthens die life. Titan Metal Products reports that a dispersion of 'dag'® Colloidal Graphite in water increased the number of "pushes" through one die from 150 to 1,000 before appreciable wear.

'dag' Colloidal Graphite also permits easier removal of the "skull", prevents the follow block from sticking to the billet, and prevents the welding of extruded metal to the die. Furthermore, smoke and toxic fumes are eliminated.

Conventional lubricants are not practical at the temperatures and pressures involved in extrusion. Your Acheson Service Engineer can show you how 'dag' colloidal dispersions will reduce maintenance and help increase profits in your mill. Also write for Bulletin 423 describing 'dag' dispersions for high-temperature lubrication.

For ready-to-use lubricants containing 'dag' dispersions, see your own oil supplier or write directly to us.

ACHESON COLLOIDS COMPANY

PORT HURON, MICHIGAN

A UNIT OF ACHESON INDUSTRIES, INC.



ACHESON COLLOIDAL DISPERSIONS:

Graphite • Molybdenum Disulfide • Zinc Oxide • Mica and other solids

Offices in:

Boston • Chicago • Cleveland • Dayton • Detroit • Los Angeles • Milwaukee
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ACHESON COLLOIDS COMPANY Port Huron, Michigan, Dept. D-2

Yes, I want your free bulletin describing 'dag' dispersions for high-temperature lubrication.

Name _____

Title _____

Company _____

Address _____

City _____ Zone _____ State _____



Edsel Marketing Plans Take Shape

Four price classes to include 18 models, says R. E. Krafve . . . Names already have been chosen . . . Dealership inquiries nearly double the number needed . . . Introduction scheduled for next fall—By T. L. Carry.

◆ RUMORS AND SPECULATION have been floating around crazily in the industry ever since Ford Motor Co. announced that it would introduce its new Edsel in the medium price field next fall.

Recently, Richard E. Krafve, general manager of the new division, dispelled some of the rumors.

Despite opinions to the contrary, Mr. Krafve says, the introduction date for the car has not been moved up. The date was set several months ago and it has not been changed. Beyond that, Mr. Krafve

would only say that the car will be in dealers' showrooms next fall.

Dealerships Open . . . Altogether, the division plans to produce 18 models in four price classes. It will have a regular 4-door sedan, 2-door and 4-door hardtops, station wagons and convertibles.

Names have been chosen for all the models. The lowest price line will be called the Ranger. Progressing upwards, the other three models will be called the Pacer, the Corsair and the Citation.

All of these titles were selected from those submitted when Ford was considering a name for the car, itself.

Mr. Krafve says that the division is still looking for qualified dealers. Although none have as yet been signed up, there have been over 2200 inquiries regarding an Edsel franchise so far.

Prices Are Secret . . . From these the new division hopes to have between 1200 and 1500 dealers when it opens up for business.

At the present time, applications are being carefully screened to find out which dealer has the most potential. In some cases, Mr. Krafve says, Ford and Mercury dealers will also sell the Edsel. But this will only be done where the market potential does not justify a separate dealership.

Mr. Krafve wants as many separate dealerships as possible but will dual them with other dealers where it is necessary.

There is still no indication of the price structure for the Edsel. But it is an open secret that the car will compete with Buicks, Oldsmobiles and possibly the Mercury.

In the meantime, the division is content to bide its time as far as a price announcement is concerned.

Plant Fire Protection

Industrial fires are a source of constant worry in a metalworking plant. They cost a lot of money every year.

Fires can throw men out of work while repairs are made. Most importantly, they can cost human lives.

Chrysler Corp. is aware of these

Missile Carrier Is Trail Blazer



ROADS are a luxury for this Teracruzer truck and Translauncher semi-trailer. It is designed to take the Matador guided missile where it wants to go, without regard for terrain. The eight-wheel drive truck is made by Four Wheel Drive Auto Co., and the translauncher by Goodyear Aircraft Corp. Debut of the vehicles was in the Presidential Inaugural Parade, Jan. 21.

How Great Lakes Steel *teems* quality

You're up on the catwalk above the pouring platform along the open-hearth pit at Great Lakes Steel. Right below, one of the giant 250-ton teeming ladles is filling another train of hot-top ingot molds.

At no step in the production of good, deep-drawing steel is control of quality more important than in the teeming operation. For defects can easily develop *unless* the entire pouring operation is done exactly right . . . the way it is at Great Lakes.

For example, these hot-top molds are designed to eliminate shrinkage cavities in the finished product. A special lining compound of graphite or tar blankets the inside of every mold to form a highly protective shield for the delicate ingot surface.

And that's only a sample of the care Great Lakes takes *every step of the way* to maintain high and uniform quality steel!

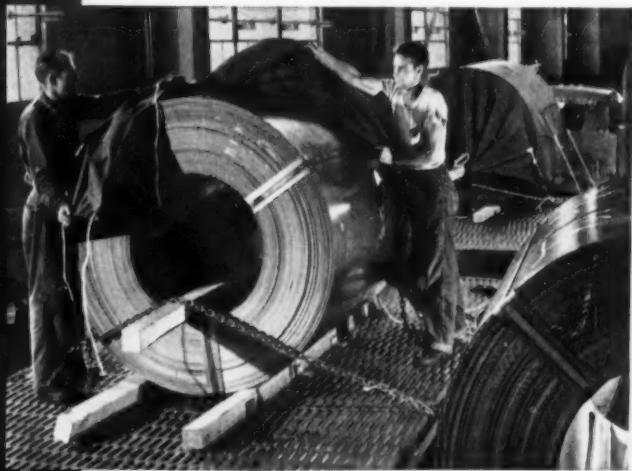
The easiest way to reach us? Simply phone our nearest representative.

GREAT LAKES STEEL CORPORATION

Detroit 29, Michigan • A Unit of

NATIONAL STEEL CORPORATION

District Sales Offices: Boston, Chicago, Cincinnati, Cleveland, Grand Rapids, Houston, Indianapolis, Lansing, Los Angeles, New York City, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Toledo, Toronto.



BUILT-IN QUALITY of Great Lakes steel is guarded through every step to final delivery. Here shipments of flat-rolled sheet coils are covered with tarpaulins for protection.

There's a Good Reason why

ZINC DIE CASTINGS

are so widely used . . .

at David White
INSTRUMENT COMPANY

IT'S

ACCURACY

You may never need a theodolite, but you will recognize the importance of accuracy in this surveying instrument. This is the tool that enables engineers to build bridges and tunnels from both ends and make them meet exactly in the middle. It also helps surveyors lay out highways and property lines. Any instrument demanding such precision must be made of very accurate parts. ZINC Die Castings are meeting that need.

Engineers at David White Instrument Company have a strong preference for ZINC Die Castings because of the consistent accuracy and other physical and mechanical properties required in their transits and levels. They find that zinc has greater resistance to shock than metals formerly used. ZINC Die Castings are also much less expensive for quantity production and greatly reduce the assembly and finishing problems.

Many manufacturers are recognizing the important quality of ACCURACY that can be obtained with ZINC Die Castings. Any die caster will show you samples of such precision work done for his customers. It may be that these examples will suggest improved qualities and cost savings for your products.

THE NEW JERSEY ZINC COMPANY 160 Front Street, New York 38, N. Y.



The research was done and the Zamak
die casting alloys were developed with

HORSE HEAD SPECIAL (99.99 + %
Uniform Quality)

ZINC
FOR DIE CASTING ALLOYS

Automotive Production

WEEK ENDING	CARS	TRUCKS
Feb. 9, 1957	146,966	22,917
Feb. 2, 1957	140,411	23,093
Feb. 11, 1956	136,308	24,659
Feb. 4, 1956	140,582	26,690
TO DATE 1957	816,500	122,708
TO DATE 1956	832,489	146,217

*Estimated. Source: *Ward's Reports*

facts. It has learned a lot of lessons from other people's experiences. Its huge stamping plant presently being erected in Twinsburg, O., will have a lot of fire protection.

Automatic Sprinkler Corp. of America is installing the fire protection equipment at the plant. It includes nearly 40 miles of inside piping which will supply water for a sprinkler system consisting of some 15,500 sprinkler heads which will protect the entire floor area.

The system also requires 2 miles of outside underground pipe including a 12-in. supply main. There will also be 18 outside fire hydrants and 90 hose stations which will use a total of 1.25 miles of fire hose.

Total weight of the whole system will be nearly 1000 tons.

It is interesting to note that Chrysler is taking these precautions despite the fact that the stamping plant itself will be of fire-proof construction.

In the light of what has happened to other manufacturers, it's obvious that you can never be too safe.

Sales:

Plymouth ahead of Buick in third place duel.

Plymouth, which lost its third place sales rating to Buick in 1954 and has been trying to recapture it ever since, is off to a good start this year.

The car is Chrysler Corp.'s bread and butter line. Chrysler realizes that it has to do better in 1957 than it has in recent years and so is pushing the Plymouth as hard as possible.

The Chrysler division was ahead of Buick in sales in November and December and for the time being is

hanging on to a slim margin. It is unofficially estimated that for the first 20 days of January, Plymouth dealers delivered approximately 30,000 units compared to some 25,000 for Buick.

Production figures for January show that 62,587 Plymouths rolled off the line compared to 52,948 for the same period last year. It is also significant to note that there was an increase in January production for every car in the Chrysler line.

Buick's production in January, on the other hand, was off 12,332 cars. The GM division produced 54,763 cars last month compared to 67,095 in January, 1956. At the same time, other GM divisions increased production with the exception of Oldsmobile which was down 4000 units.

What's the reason for Plymouth's sudden rise?

Detroit pundits generally agree that the main reason could well be styling. The Plymouth is probably one of the best looking cars on the road this year.

Edward T. Ragsdale, Buick general manager, says that sales for the last 10 days of January were up 25 pct over the previous 10 days. This is entirely possible as there were more actual selling days in

AUTOMOTIVE NEWS

that period than there were in the second 10 days of the month.

Mr. Ragsdale is also looking for a return of the traditional spring selling season this year. It was mainly the failure of this selling spurt to materialize in 1956 that contributed more than anything else to disappointing sales last year.

The Buick manager contends that when the score is added up at the end of the year, Buick will still be in third place.

This is entirely possible. Mr. Ragsdale is counting on a spring buying spree to make it so.

At the same time, it's going to be interesting to watch how Plymouth will fare.

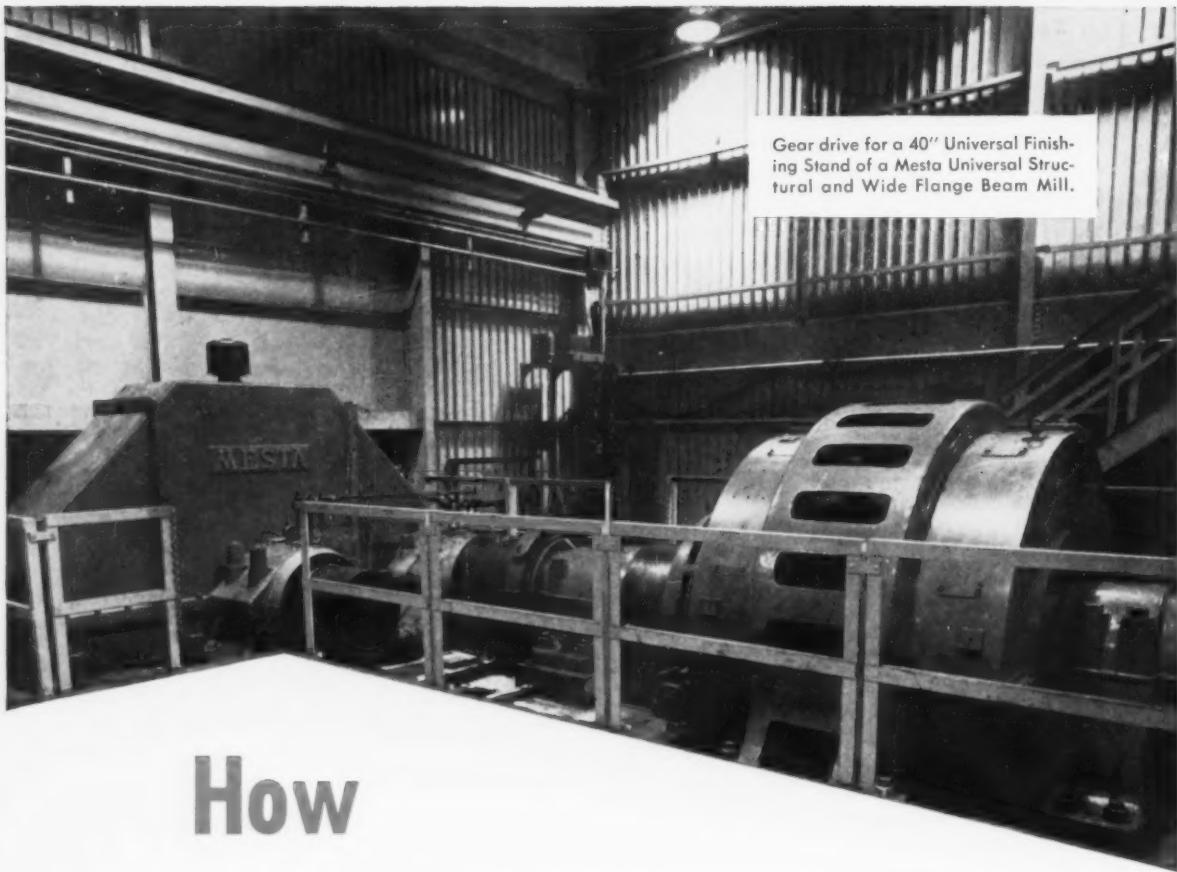
One of Plymouth's drawbacks in the race is its hardtop productive capacity. It is estimated that only about 15 pct of Plymouth's production is in hardtops. Buick's hardtop production, however, can run as high as approximately 40 pct of total output.

This factor alone may decide the race. In the meantime, it's going to be very close.

THE BULL OF THE WOODS

By J. R. Williams





Gear drive for a 40" Universal Finishing Stand of a Mesta Universal Structural and Wide Flange Beam Mill.

How to protect gears when the pressure's on

Gear drives running under long, heavy duty service—or shock loads—need a lubricant that will adhere and protect metal surfaces. *Texaco Meropa Lubricant* does that dependably. It contains special polar additives that insure greater adhesion to metal under *all* conditions. *Texaco Meropa Lubricant* stays where it's needed—on the gear surfaces.

Extreme Pressure properties of *Texaco Meropa Lubricant* give its lubricating film greater toughness for better gear protection—at far beyond normal

operating requirements. It resists heat—has great stability—won't foam. And it's noncorrosive to gears and bearings.

Your nearby Texaco Lubrication Engineer will gladly help you get smoother gear performance, and reduce maintenance costs. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street,
New York 17, N. Y.



TEXACO Meropa Lubricants
FOR STEEL MILL GEAR DRIVES

TUNE IN . . . METROPOLITAN OPERA RADIO BROADCASTS EVERY SATURDAY AFTERNOON



T-H Action Is Coming—But Slow

Ike wins some converts to proposals for moderate change . . . But action this year is unlikely . . . Government controls are threatened if voluntary anti-inflation measures fail—By G. H. Baker.

♦ IKE'S NEW PLANS for rewriting the Taft-Hartley labor law win friends in Congress.

This doesn't necessarily mean that the controversial 10-year-old labor law will be repealed this year. But Ike has made new converts among both Republicans and Democrats for making changes.

Support for a basic re-write job grows, month by month. By 1958, the White House may well have won over enough converts to ram through some far-reaching changes.

As matters stand now, you can expect to hear a lot of heated comment from the Senate and the House in the weeks ahead. But neither chamber will change the Taft-Hartley law this year.

Actually, Ike's proposals for changing the law are temperate, quite moderate in tone. The changes in the law that Ike is asking are regarded as moderate by political leaders. For example: Despite the clamor of labor leaders, no changes are being asked in the rights of the states to enact right-to-work laws.

Humphrey on Taxes

Treasury Secretary George M. Humphrey tells Congress some details of his plans for tax cuts. He emphasizes:

Government spending must be cut before tax rates are lowered.

Government revenues should be higher than at present.

Make the reductions in rates worthwhile, and make them apply to everybody.

Mr. Humphrey maintains strongly that it will be a mistake to cut

taxes for any one special group like small firms, unless the revenue loss is slight.

Present tax rates are excessive, he says. Today's rates are so high that in the long run they will hamper the nation's growth. Incentive to expand and to open new businesses is being destroyed.

More School Aid?

Construction of new school buildings will spurt ahead sharply if Congress votes the \$1.3 billion President Eisenhower is asking.

The Administration tells the

Congress that state and city governments are not moving fast enough in providing new school buildings. The federal government can authorize construction projects faster than local governments, Congress is told.

The Welfare Dept. estimates that school enrollments exceed school capacity by 2.3 million children. Overcrowding, split-day sessions, and makeshift quarters are the result.

Congress is disposed to vote at least a part of the requested funds, provided the integration issue is not injected.

It Looks Bad For Mineral Buying Program

Supporters of continued government subsidy purchases of four strategic minerals are facing a tough fight in an economy-minded Congress.

The House has already scuttled the program. Backers now hope Senate will revive it.

President Eisenhower has asked for an emergency appropriation of \$30 million to keep the program going through the end of this fiscal year on June 30. Minerals involved are tungsten, asbestos, fluorspar, and columbium-tantalum.

The purchase program is under attack as an "unjustified subsidy." The government has

been buying tungsten for \$55 a unit ton. Foreign tungsten is selling in this country for about \$35. Opponents also claim the government now has a five-year stockpile supply of the minerals.

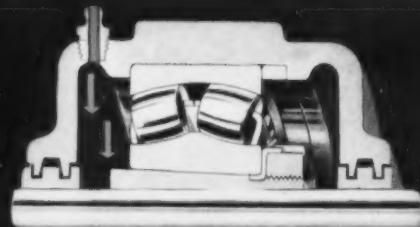
Backers of the program, mostly congressmen from Western mining states, say that this country will be dependent on foreign suppliers in an emergency unless the buying program is continued. The mines will close without the program.

Backers hope that even if the government runs out of funds this spring for a short time, Congress will vote more money for the new fiscal year.

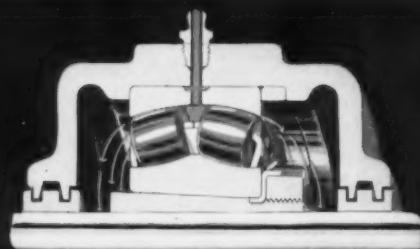
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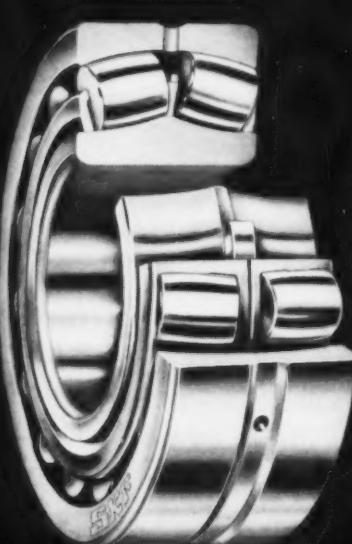
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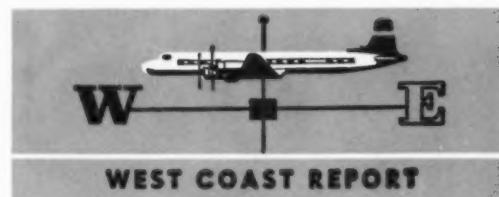
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Auto Assembly Plants Are Riding High

Now supplying 10 pct of the nation's car needs, the West Coast assemblers are kept busy . . . However, thanks to population gains, they'll be even busier . . . Ford and GM expanding operations—By R. R. Kay.

♦ THERE'S NO GLOOM in auto assembly plants on the West Coast. They're rolling along at a good rate of speed. And they'll probably increase their output over last year.

Here's why: some 18 pct of U. S. motor vehicle registrations are in the 11 Western States. Population increases will push this figure to 20 pct this year. Automakers will need to hike quotas to keep up with the demand. It's been traditional for West Coast assembly plants to turn out 10 pct of the nation's production. But that figure is sure to go by the boards.

More and More . . . It adds up to this: more plant space, equipment, and workers; and more millions from purchasing agents eager to buy materials and services on the Coast. Purchases in 1956 were \$225 million. Chrysler, Ford, and General Motors insist they will buy more in the area.

Ford is all out for a bigger share of the car market in the area. The company will step up production at its new Milpitas (San Francisco Bay Area) plant. What's more, this plant will also assemble the new Edsel. Ford expects to sell 12 pct of its Edsels on the West Coast.

Plentiful Plant Planning . . . The new 1.1-million-sq-ft, 175,000-unit Mercury plant at Rosemead (Los Angeles area) should be ready in the fall. This will give the old Mercury plant at nearby Maywood room for Edsel assembly. And the chances are good that that's how it will work out.

General Motors put the brake

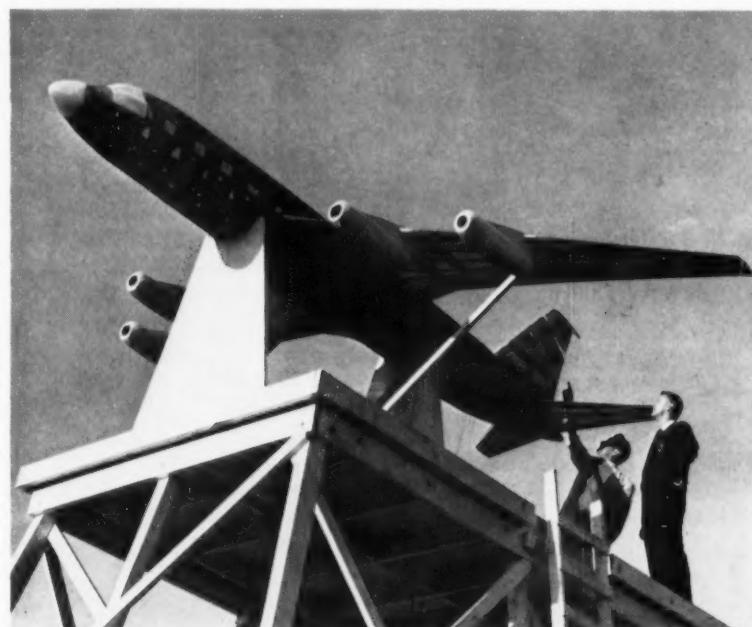
on its planned Buick-Oldsmobile-Pontiac plant in the San Francisco Bay Area at Sunnyvale. But it's only temporary. GM officials say the 1.25-million-sq-ft plant, second B-O-P plant in California, is very much in the cards—just delayed a bit. Output would run about 100,000 cars per year.

Meanwhile, work is half-finished on a major expansion of the Los Angeles area Chevrolet plant at Van Nuys. The \$13.5 million project will add 300,000 sq ft, doubling the present manufacturing area. When it's completed, the work force may also be doubled.

West Coast Briefs

There's talk that Bethlehem Pacific Coast Steel Corp. is planning to add a 100-ton electric furnace to its Los Angeles works. Present capacity is 478,000 net tons per year.

The weather has put a crimp in the State of Washington's aluminum industry. An unseasonable cold spell caused a shortage of electric power, cutting U. S. aluminum production 10 pct. More than 1000 workers in light metals plants are idle. At least 2000 more in other industries are also out of work.



NO SECRETS about 1000-mile communication system of Convair's 880 jet transport will remain after engineers get through with this 17-foot mockup. The model, covered with bronze screening to duplicate the 880's electrical properties, houses a transmitter to generate test signals.



Consider your press operator when you consider an O.B.I.

We've talked to a lot of press operators about our Clearing O.B.I.'s. "We like them," they tell us. "they're easy to run. Quiet. And you have a feeling that they can't go wrong on you." Frankly we listen real good to a press operator because he can tell us a lot about our equipment. In fact, the safety designed into our O.B.I.'s—the simple cleanliness of the design, the accessibility of controls—these things were figured from the needs of the man running the machine.

The quiet operation that operators like—well

that's just a function of fine construction of Clearing O.B.I.'s. Sort of a bonus factor you might say. Next time you see a fellow running a Clearing O.B.I., ask him how he likes the machine. It's an important point. An operator who likes his equipment will do a better job. If he feels safer, his morale is better. These things mean improved production, a happier shop. And a happy shop is usually a profitable one.

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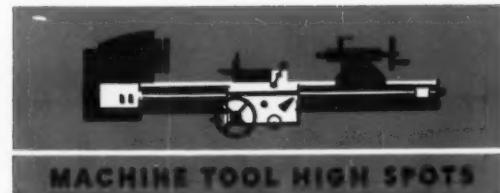
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Plenty Of Room For Machining Education

Some areas of metalworking lag . . . Big gap exists between vanguard and lagging segments of machining . . . Example is neglect of carbide tools for natural applications . . . Education needed—By E. J. Egan, Jr.

◆ PROGRESS in the science of machining metals is about what you'd expect from an inchworm with a bad case of rheumatism. The head end is way out into new territory but the tail has a tough time catching up.

Just look at it this way. People in the vanguard of machining progress are working successfully with numerically controlled machines, ceramic tools, and fully integrated machining, handling, assembly and inspection systems.

Lots To Learn . . . At the tail end of the line others are still working with 30, 40 and 50-year old equipment. And in many shops where the machine tools could be classed as fairly modern, people still haven't learned to use cemented carbides to advantage.

It's more than 20 years now since carbide tools were introduced in this country. They didn't take the machining industry by storm, nor were they ever meant to, most likely. There are still many metal-cutting tasks that, in the overall picture, are best handled with other types of tools.

But what about those jobs on automates, for example, that should be "naturals" for carbides? What's the big holdup? Carboloy field engineers from General Electric's Metallurgical Products Dept. say it's "mental rather than metal."

Who's To Blame . . . They point out that where carbides have failed on automates, the fault lies, in most cases, with improper application or design approach. To yield production gains, they say,

carbide tools must not merely substitute one cutting edge for another. Good carbide usage follows a pattern all its own.

They agree that carbide tooling on automates usually takes more setup time, but in the actual cutting period it will put two to three times more finished work on the floor.

This leads to the suggestion that getting the most out of carbides might take two men, a setup man and an operator. Not a bad idea, if at the end of a day the team would show two or three day's output from one machine.

The point is that after 20-odd years, carbide producers are still teaching the tail end of the machining line. They're not the only ones, either. Much of the logic that machine tool builders preach about up-dating antique equipment falls on deaf ears, too.

Meanwhile, what goes on up at the head end of the machining "inch worm?" In aircraft production, numerically controlled ma-

chine tools have had their shake-down cruise. The Air Force calls the play on a lot of the equipment that plane makers buy, and where skin mills are concerned it won't buy anything else.

Ceramic tools? The claims and counterclaims, good reports and bad ones, bounce back and forth like rumors about Russia's next move. It's too soon to predict just how big a factor they'll be eventually. But next month's Silver Anniversary meeting of the ASTE in Houston, ought to be a pretty good curtain raiser.

There'll be a Ceramic Tool Symposium to detail just about everything there is to know in this field—history, current uses and future prospects.

The idea of using ceramic cutting tools is more than 50 years old, but it skipped the attention of most people until about three years ago. Now these things are just about the hottest item in the machining picture.

Carbide Cut-Off Tools Pay Dividends

Several firms report using carbide cut-off tools successfully. They're made up of solid carbide shanks tipped with different grades of carbide to do the actual cutting. Rectangular cross section of the shank provides firm support for the cutting edge. A side clearance angle is ground on the cutting tip only.

Using this approach on 52100 steel tubing with a 4½ in. OD and a ½ in. wall, one firm cut machining time per piece from 2.47 minutes to 0.85 minutes. Job was done on a single spindle, 5-in. Cone automatic at 290 fpm with 0.004-in. feed.

Users tell you...

How Norton wheels cut O.D. grinding costs and improve quality

Here's the "Touch of Gold" to give your cylindrical and centerless grinding great advantages

Cooler cutting action . . . faster stock removal . . . better finish . . . more pieces per wheel and dressing . . . easier dressing, with less wear on diamond or crushing roll.

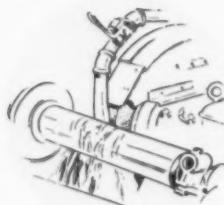
Those are typical benefits reported by Norton G Bond and BE Bond wheel users all over the country — concerning every type of O.D. grinding.

It's because both G Bond and BE Bond wheels are so well adapted to cylindrical and centerless grinding. They hold each abrasive grain for maximum cutting action — and out-

perform all other wheels in many grinding operations, precision or semi-precision. The new Norton "44" ALUNDUM abrasive is proving to be the most outstanding non-premium-priced abrasive for many O.D. grinding jobs.

Note how these wheels can add the "Touch of Gold" that will boost your own product quality and profits. And remember: only Norton offers you such long experience in grinding wheels and grinding machines to help you produce more at lower cost.

Typical Performance Reports on "44" ALUNDUM* Abrasive



CYLINDRICAL GRINDING

A Wisconsin plant, grinding 2" to 4" diameter steel shafts, 12" length, reports 44 ALUNDUM wheels (44A54-KVBE) cut faster and cooler with no sacrifice of wheel life, compared with best previously used wheels.

A Michigan plant, grinding miscellaneous high speed steel bolt heading dies, finds 44 ALUNDUM wheels best. Reasons are more pieces per dressing, cooler cutting action and 30% longer wheel life than formerly used wheels.

A New Jersey plant found a 44 ALUNDUM wheel (44A36-MVBE), plunge grinding different steel parts, gave many more pieces per dressing and averaged 15% longer life than wheels they used before.



CENTERLESS GRINDING

A Michigan plant, of the smaller jobbing types, grinding all kinds of materials. They prefer 44 ALUNDUM wheels (44A801-NVBE) for versatility, less dressing and faster cutting — including 10-hour completion of a job which used to take 14 hours.

An Ohio plant removes .008" on the rough grind and .003" on the semi-finish grinding of No. 1010 steel crankshaft pins. While standard wheels gave an average of 600

pieces per dressing, they report a 44 ALUNDUM wheel produced 1,000 pieces. All stock was removed in one pass, compared with two passes formerly required.

Another Michigan plant, of large size, tested a 44 ALUNDUM wheel in grinding hardened steel tappets. They report more pieces per dressing, faster cut and less burn than ever obtained before.

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for further proof of how Norton O.D. wheels can bring you best possible results. He'll gladly arrange a test in your plant. Distributors in all industrial areas listed under "Grinding Wheels" in the yellow pages of your telephone book. Behr-Manning Division, Troy, New York. Export: Norton Behr-Manning Overseas, Inc.

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The Iron Age

SALUTES

Edward Remde

Retired vice president of Baker-Raulang Corp., he is from the vintage of self-made engineers; pioneered in developing the fork lift industrial truck. Many of his designs are still used in industry.

Anyone claiming fatherhood to the fork lift truck industry will have to check his credentials against those of Edward Remde, retired vice president of Baker-Raulang Corp.

He was chief engineer at Baker-Raulang when the first cantilevered ram truck—the ancestor of all ram, platform and fork trucks—was designed. He designed the first alloy-steel industrial truck axle using an alloy known as Scott Type D (now SAE 6150).

One of Mr. Remde's patents made possible the switch from automotive chain drives to drive shafts. And he's made contributions to electric propulsion motors, controllers, steering and braking systems, gears and axles still used by today's designers.

Of all his accomplishments, Mr. Remde is probably proudest of his alloy axle. Working with Walter Baker, automotive pioneer, and C. J. Scott, a Cleveland metallurgist, he helped

pin down the best alloy steel available for the axle.

He had to persuade a forge shop to risk hammers and dies on the new material, then find a steel company to make it. When he couldn't place orders for the steel in sufficient quantity to interest any mill, Mr. Remde modified the axle, and he and Walter Baker sold it to Ford for early Model T's. With Ford in the market, Baker's supply of the new steel was assured.

Ed Remde was born in Medina, N. Y., back in the days when engineers were self made men. After graduating from Medina Academy in 1895, he picked up his engineering knowledge through experience. He credits much of his early mechanical education to Walter Baker, whom he remembers as something of a genius.

The industrial truck industry has since grown into a big industry. Few, if any, persons have given it a bigger lift than Ed Remde.

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ALFRED BERSTED, elected executive vice president, McGraw-Edison Co.



HENRY G. RITER 3rd, elected vice president, McGraw-Edison Co.



REAR ADM. CHARLES R. KHOURI, elected president, Pittsburgh Steamship Div., U. S. Steel Corp.

The Iron Age INTRODUCES

A. O. Schaefer, elected president, Pencoyd Steel and Forge Corp., Philadelphia.

Morris L. Hutchens, elected vice president, engineering, Kearney & Trecker Corp., Milwaukee; **Herbert Whitney**, named chief metallurgist; **Charles Parske**, named chief engineer, General Engineering Dept.

William A. Harshaw II, elected vice president, research, The Harshaw Chemical Co., Cleveland; **Leslie N. Smith**, elected vice president, Scientific Div.

Wayne M. Pierce, Jr., elected vice president, engineering and manufacturing, Norden - Ketay Corp.

Kurt J. Ucko, elected vice president, Kurt Orban Co., Inc., Jersey City, N. J.

J. H. Bowman, Jr., elected vice president, sales, Allegheny Steel Band Co.; **H. B. Bowman**, elected vice president, operations; **L. J. Frey**, named general manager, sales; **R. K. Scharff**, named eastern div. manager; **J. L. Brewer**, named Washington, D. C., district manager; **D. S. Hodges**, named Cincinnati district manager; **T. A. Kearns**, named head, inside sales.

A. S. Thaeler, elected vice president, engineering, Pittsburgh Steamship Div., U. S. Steel Corp.

R. A. Shaw, Sr., named executive asst. to president, American Bridge Div., U. S. Steel Corp.; **O. E. Barnum**, named treasurer, American Bridge Div.

Robert M. Whitaker, appointed treasurer, The Beryllium Corp., Reading, Pa.

Duncan J. Brown, appointed supervisor, milling machine sales, Brown & Sharpe Mfg. Co., Providence, R. I.

W. W. Rinehart, Jr., named asst. controller, central accounting, Crucible Steel Co. of America, Pittsburgh; **Lawton Howell**, named asst. controller, works accounting.

Robert W. Richardson, and **Norman S. Barnes**, named asst. sales managers, The Spencer Turbine Co.; **David H. Hunt**, named asst. chief engineer; **Karl A. Hedling**, named chief draftsman.

Daniel A. Porco, named manager, development, Crucible Steel Co. of America, Pittsburgh.

W. R. Heckman, named asst. manager, operations, Clark Controller Co., Cleveland; **J. H. Heuslein**, named production planning manager.

Raymond W. Drake, appointed asst. manager, sales, Pittsburgh district, American Steel & Wire Div., U. S. Steel Corp.



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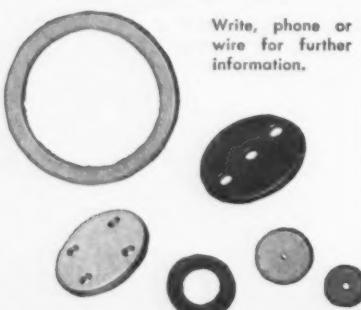
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Clifford H. Hagberg, named asst. sales manager, **The Bullard Co.**, Bridgeport, Conn.; **Edward A. Sundstrom**, named district manager, Chicago sales office.

Robert J. Wolf, named division manager, **Kaiser Engineers**, Div. of Henry J. Kaiser Co., Oakland, Calif.

Wesson C. Miller, named sales manager, **The Parker-Hartford Corp.**, Hartford, Conn.; **Richard G. Campbell**, named controller.

N. Heath McDowell, named general sales manager, **Airaterra Corp.**

Alvin H. Barrows, named asst. manager, sales, Philadelphia district office, **U. S. Steel Corp.**

George A. Darsie, appointed eastern district sales manager, **Silicone Products Dept.**, **General Electric Co.**, Waterford, N. Y.

R. A. Wendorf, named sales manager, **Automotive Div.**, **A. O. Smith Corp.**, Milwaukee.

Clarence R. Lee, appointed asst. superintendent, **U. S. Steel Supply Div.**'s Cleveland warehouse, **U. S. Steel Corp.**

Adolph A. Hirstius, named asst. manager, sales, Philadelphia district sales office, **American Steel and Wire Div.**, **U. S. Steel Corp.**

Following appointments are within the Cutting Tool and Conventional Gage Sales Dept. of **Pratt & Whitney Co.**, West Hartford, Conn.: **C. W. Moeller**, named asst. sales manager, conventional sales; **P. J. DesJardins**, named chief cutting tool sales engineer; **F. J. Hurst**, named Kellerflex sales engineer; **E. H. Riemer**, named cutting tool sales engineer; **O. A. Gingras**, appointed gage sales engineer.

James E. Pierce, named district sales manager, Pittsburgh district, **Jones & Laughlin Steel Corp.** He succeeds **William Miller** who retired on Jan. 31.



JOHN R. JOHNSON, elected asst. vice president sales-solicitation, **U. S. Steel Corp.**



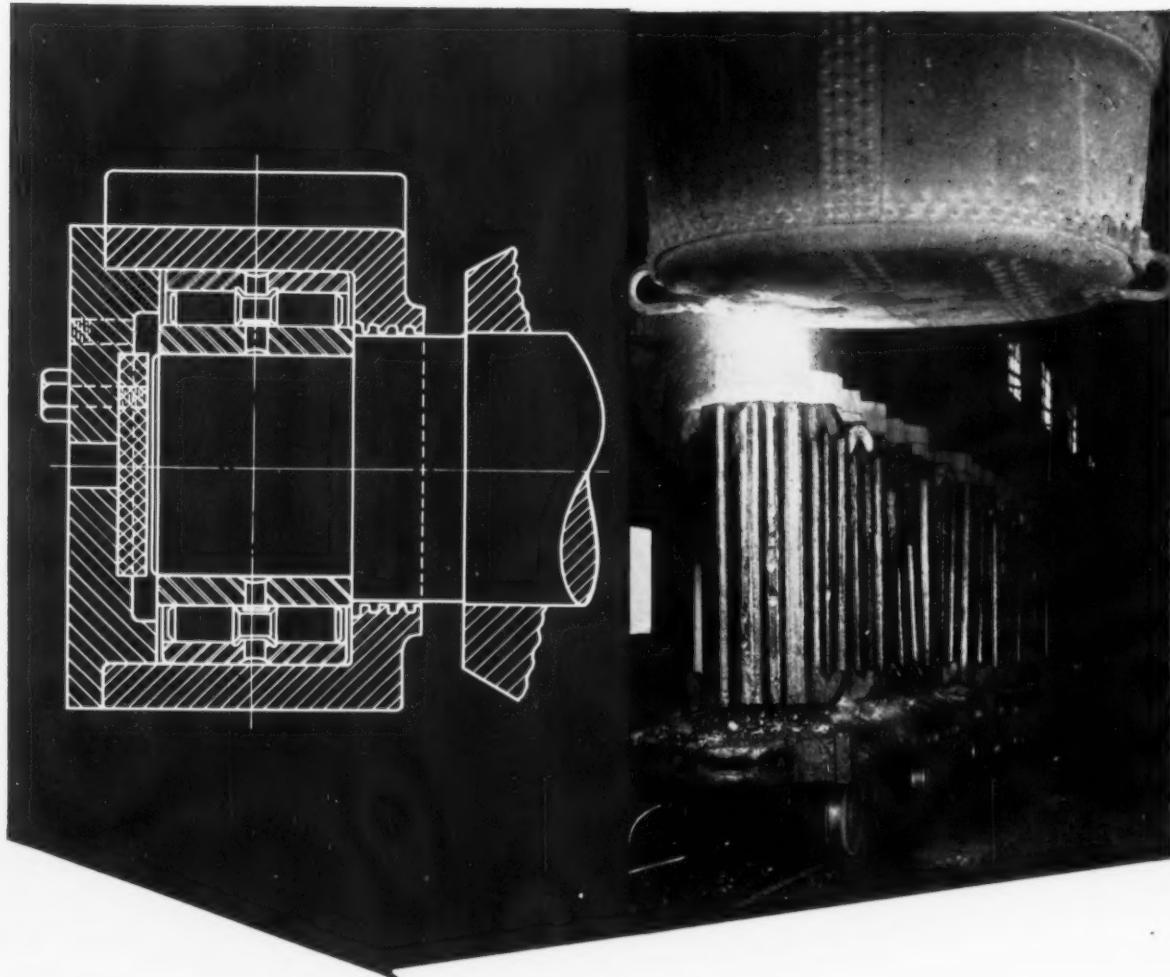
M. M. CHAPMAN, elected asst. vice president, sales-distribution, **U. S. Steel Corp.**



BAY E. ESTES, JR., named director, staff administration, **Commercial Dept.**, **U. S. Steel Corp.**



RAYMOND E. CHANNOCK, elected vice president and treasurer, **The National Acme Co.**, Cleveland.



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Ingot mold cars for a large tube mill were continually out of service due to the short life of babbitt, bronze or other bearings originally supplied in the cars.

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The Result. The new bearing is designed on a new principle that keeps rollers in line and eliminates skewing. Shock loads due to uneven tracks have little effect on our installation for its construction makes possible a greater number of rollers available to support the load at all times.

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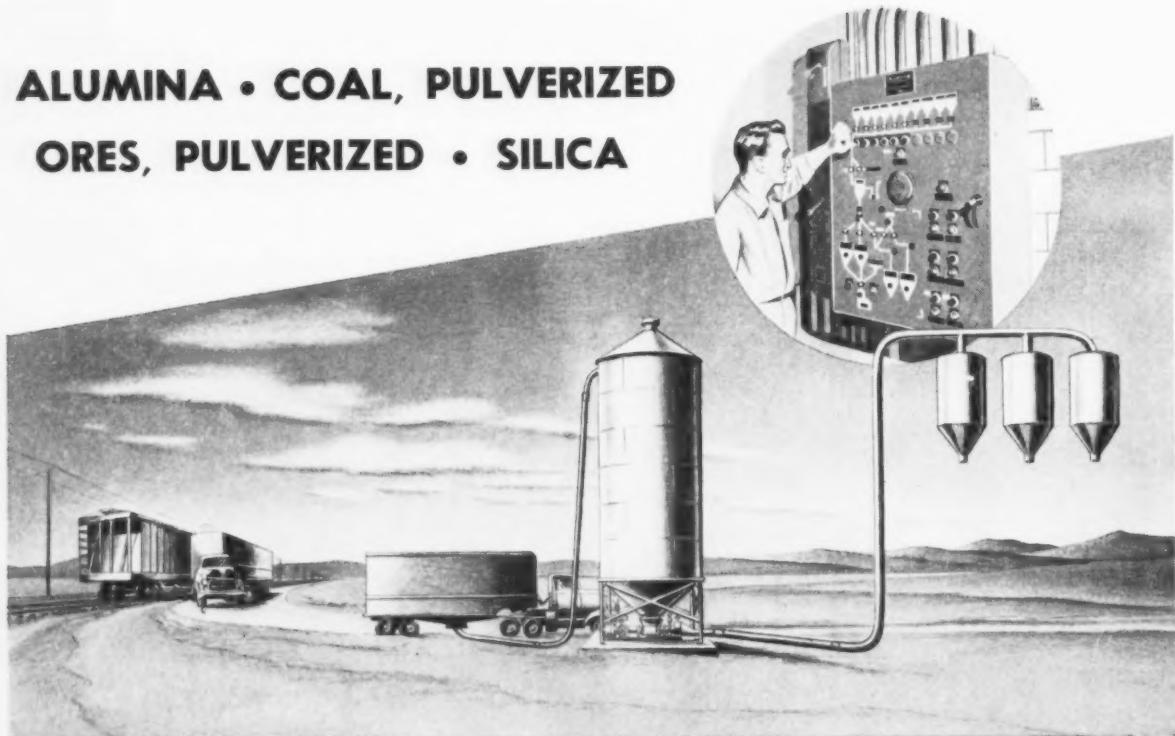
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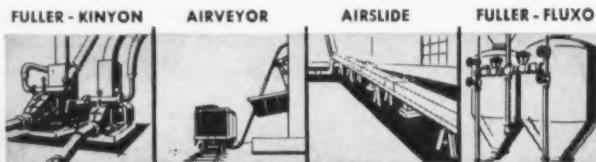
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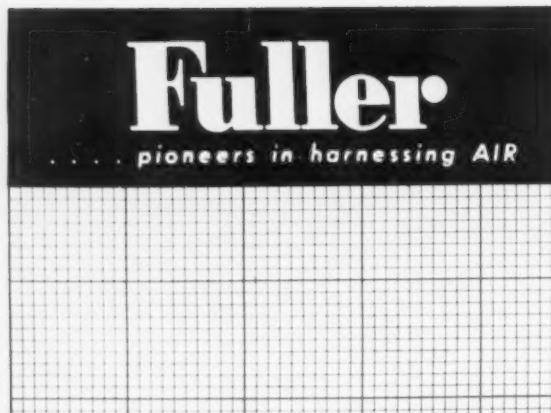
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Bonus Quality



This 22-B clamshell is handling scrap for a Columbus, Ohio steel plant.

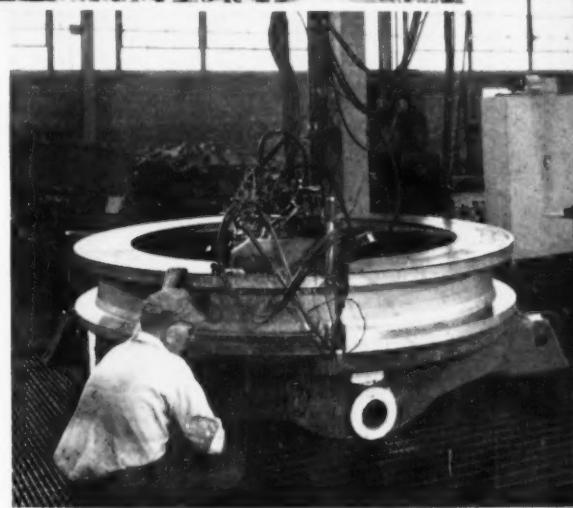
Handle scrap the money-saving way —with a Bucyrus-Erie 22-B crane

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Another important advantage — long working life. With normal care your 22-B will deliver years of extra service, because it is backed by research, engineering and manufacturing facilities that are unexcelled in the industry.

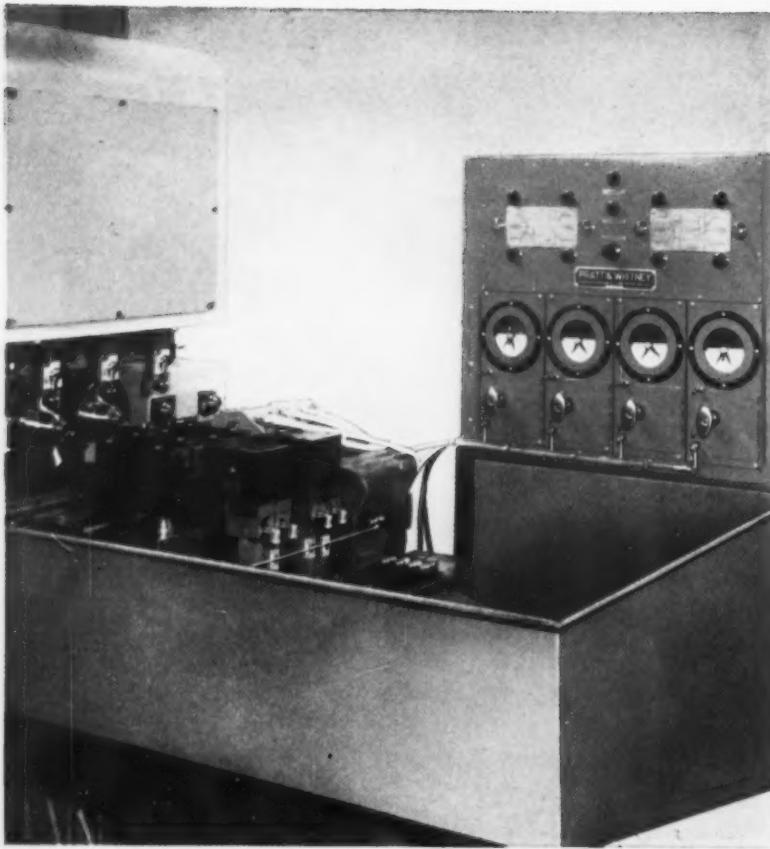
Your distributor can supply complete information on the standard or heavy-duty 22-B crawler cranes, or the highly maneuverable rubber-tired Transit Crane. See him soon.



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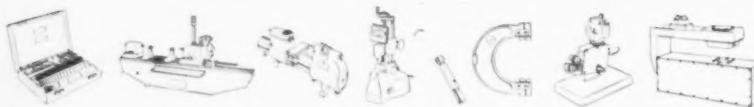


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R. C. Robinson, appointed manager, operations, American Bridge Div., U. S. Steel Corp.

F. Bruce Bevelheimer, named power and fuel engineer, Jones & Laughlin Steel Corp., Pittsburgh.

Malcolm H. Townsend, named advisory metallurgist, Marketing Dept., Industrial Heating Dept., Westinghouse Electric Corp.

Henry B. Koehler, named electrical sales engineer, Hanson-Van Winkle-Munning Co., Matawan, N. J.

Following men have been appointed abrasive engineers for Norton Co., Worcester, Mass.: **Robert T. Haigh**, western New York; **Charles R. Garfield**, Pittsburgh and northwest Pennsylvania; **David L. Lloyd-Rees**, Pittsburgh and southwestern Pennsylvania.

Robert G. Hall, named blast descaling representative, Pangborn Corp., Hagerstown, Md.

Robert J. Kiefer, appointed sales representative, Chicago, Laclede-Christy Div., H. K. Porter Co., Inc., St. Louis, Mo.

H. B. Parfet, Jr., named sales engineer, Electro Metallurgical Co.

E. A. Miller, named Chicago district manager, Frit & Glaze Div., Ferro Corp., Chicago.

J. Frank Frain, named principal engineer, Kaiser Engineers Div. of Henry J. Kaiser Co., Oakland, Calif.

Raymond F. LaCour, appointed supervisor, Divider-Wall Div., E. F. Hauserman Co., Cleveland.

James C. Mourkas, named asst. to manager, Tin Mill Products Div., Jones & Laughlin Steel Corp.

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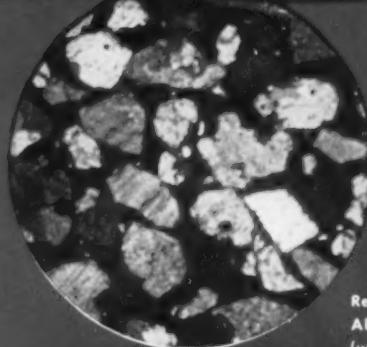
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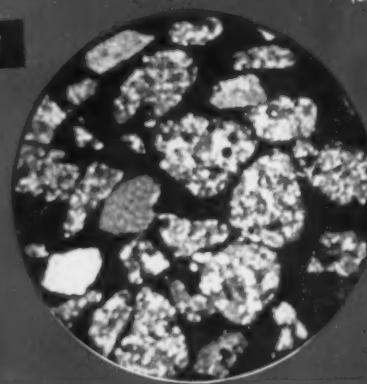
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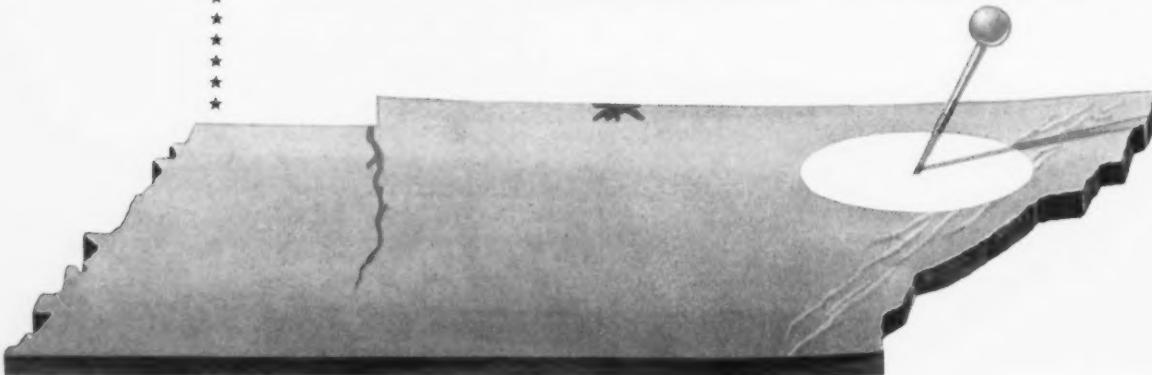
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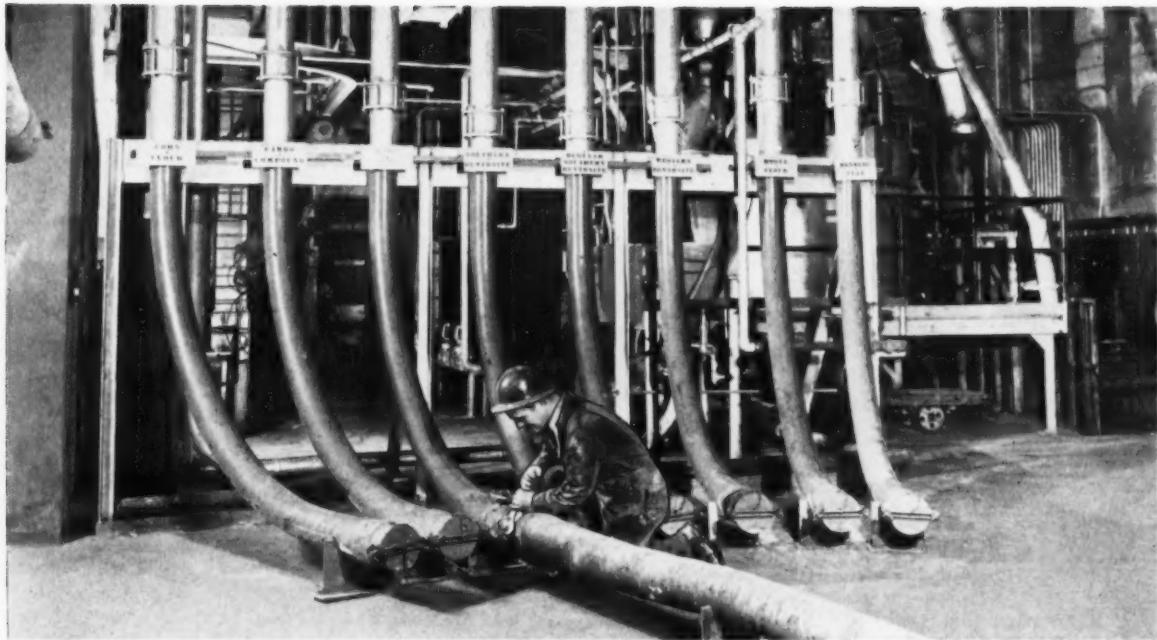
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QUICKLY SWITCHED: This one hose unloads and conveys any of eight core binders. (Dracco Corp. photo.)

Air Conveyors Breeze Through Tough Handling Chores

By E. J. Egan, Jr., Machinery Editor

■ Air conveyors do many useful jobs in metalworking plants. Every day they whisk a huge variety of bulk materials, paperwork and small metal parts through thousands of miles of tubing. The principles involved couldn't be simpler. You either blow things through a tube or you vacuum them out.

Bulk conveyors mean just what their name implies. They've shown many firms that it's cheaper to buy raw materials in car or truckloads than in small packages. And they drive the lesson home with demonstrated savings in labor and other handling costs.

Bags Are Out—For example, one

An air conveyor can be much more than just a tube and a blower these days. Fully-integrated handling is the trend.

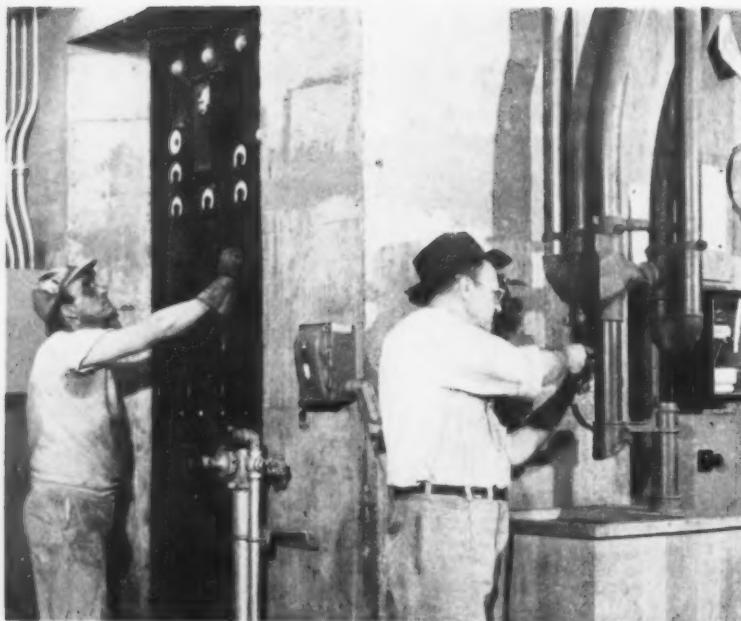
And where operations are complex, such systems can be made completely automatic.

large automotive foundry buys eight different core binders. If it took delivery in 100-lb bags, it would take three men four hours to unload 20 tons of the bagged materials, split open the bags and transfer the contents to storage bins for later use.

A bulk-type air conveyor can unload a freight car full of foundry sand in a morning.

Just as simply, a sealed carrier in a slim pneumatic tube can deliver messages or small parts at the flick of a wrist.

But with an Airstream conveyor made by the Dracco Corp., Cleveland, three men transfer 20 tons from a freight car to a hopper in one hour. The foundry's estimated annual saving is \$32,000, based on a \$2.00 hourly wage and a nine-hour day.



HOT STEEL: Melt supervisor inserts sample from a heat into a special carrier for quick tube transport to the lab. Pour is held by furnace controls (left) until the lab reports back. (Lamson Corp. photo.)

But that's not all. Although all eight materials must pass through a single flexible tube en route to storage, they cannot become mixed or contaminated. The system cleans itself after each transmission.

Keeps Dust Down—Foundry officials also report other benefits from the system: no dust in the plant, no moving parts to endanger workers, no servicing required in the first year of operation.

Another Dracco system in the plant of a major home appliance manufacturer recovers porcelain enamel dust from spray booths and returns it to process storage. The previous method of collecting dust involved 16 manhrs per day, the use of dumpcarts and considerable waste and spillage.

The automatic air conveyor system saves about \$36,000 annually in enamel alone. It also eliminates all manual handling. As an added benefit, it returns clean, filtered air to the plant.

Saves Fuel—Standard Forgings Co., East Chicago, Ind., uses a Dracco installation to deliver pulverized coal to boilers that pro-

duce steam for its forging hammers. One man oversees the setup that (1) delivers all requirements in one shift instead of three; (2) permits the use of cheaper coal; (3) is dust-free; (4) saves over \$35,000 yearly on fuel and labor.

Air conveyors engineered by the Fuller Co., Catasauqua, Pa., are in daily use in many plants moving such materials as alumina, copper rust, taconite — virtually any dry, pulverized bulk material. System capacities range from a few tons to 300 tons per hour.

Pneumatic chip handling and oil reclamation systems are other time and money savers. Installations engineered by National Conveyors Co., Inc., Fairview, N. J. serve needs ranging from single-machine disposal to the collection of multiple-alloy scrap from numerous plant locations.

The firm's Chipveyor equipment at one plant allows two men to load a car with 50 tons of chips in 20 minutes. It formerly took 6 man-days to load 27 tons of chips from a dock into a car. Another customer handles only five tons of chips a day, but cut handling costs

Continued Page 118

Jet-Propel Bearings Through Plastic Tubes

Here's a highly-efficient, air conveyor that licked a tough production problem at the Meriden, Conn., plant of General Motors' New Departure Div. The trouble spot was a special department that makes small ball bearings (0.8661 in. OD by 0.2756 in. wide) for electric motors.

Several conveyor systems were tried. None could deliver parts fast enough to match production quotas.

Jets Propel—Finally the firm's engineers designed the present setup. It uses timed jets of 20-psi compressed air to blast workpieces through sections of clear plastic tubing.

Each tube section is literally a plastic track, complete with interior guide rails. Most of the system is overhead, in plain sight. With its vertical segments, zig-zags, sweeping curves and long straightaways, it looks like a scale model of a mass transportation setup for the "city of the future."

But this is not a toy. It's a vital production element, moving 1600 inner and outer rings and 800 completed bearings every hour.

Loads, Too—Nor is it merely a conveyor system. For example, these tubes actually load and unload the automatic grinders. Grinding operations are so well integrated that one man can attend four or five machines. A minor adjustment here or there is all that's necessary.

To understand the basic system, study the accompanying diagram. Assume that automatic machines 1, 2 and 3 all do the same face grinding job on the outer rings. Assume also that the rotary hopper supplies rings to all three machines.

Stay On Track—Lengths of extruded plastic tubing link the hopper to the grinders. These tubes have six rounded ridges on their inner walls, as shown at

A. Outer bearing rings contact all six ridges as they move through the tubes. With the smaller inner rings, the bottom ridge supports the ball race and the lowest pair of side ridges keep the parts from wobbling.

When the system is operating, the rotary hopper drops rings into a tube that feeds the air elevator ("B") by gravity. The elevator is also made of clear plastic. Its escapement rolls one ring at a time into place above the timed jet of high velocity air.

The jet boosts the ring up and around the curve, into the speed reducing jog at "C." To slow the ring, some of the air exhausts through a hole in the curve, "D."

Can't Overload—From the speed reducer ("C") rings feed to each machine by gravity. When the tube and zig-zag accumulator leading to Machine 1 fills up, a plastic feeder junction ("E") passes rings to Machine 2. A similar junction above Machine 2 passes its overflow to the third grinder. A final bypass over Machine 3 returns excess rings to the hopper by

means of a return elevator, "F."

The zig-zag accumulator and speed reducer leading to Machine 1 is not used for all gravity drops. In some cases, counterbalanced metal fingers ("G") slow the descent.

To avoid confusion, the diagram does not show the tubes that carry discharged rings from each grinder to subsequent machines, nor those that move bearings through final assembly and inspection stations. However, these movements are made by means of the basic system elements already described.

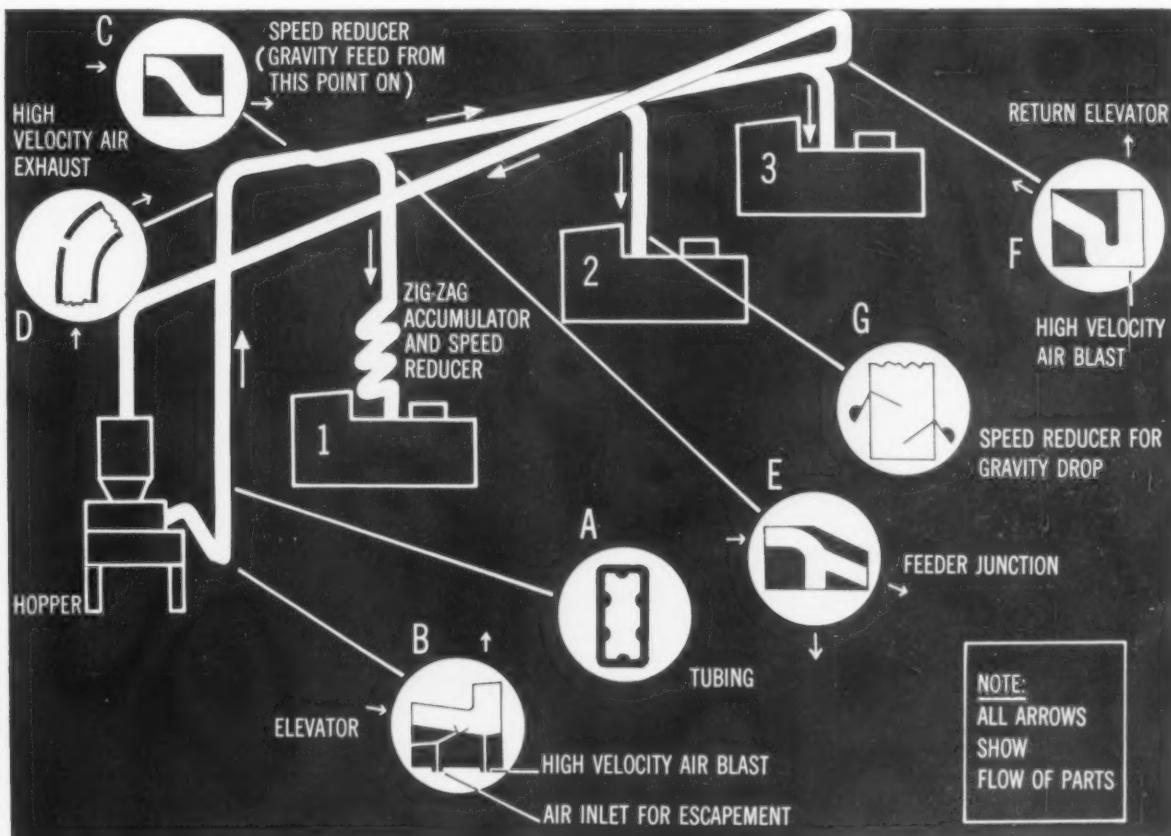
Handles Easily—A prime advantage of the plastic tubing is its flexibility for rearranging shop layouts. A hot water dip makes it bend easily, and it can be cut and quickly fitted into place by relatively unskilled personnel.

In addition, the tubing will not support combustion. It not only resists wear, but does not damage precision finished parts. And because it is transparent, work stoppages can be spotted quickly.

Some Uses For Air Conveyors—

A recent IRON AGE survey shows that 13 pct of the metalworking plants reporting use air conveyors. These are some of the materials they convey.

Foundry sand
Limestone
Cupola repair mix
Metal chips
Electric bulb bases
Stampings
Small electronic parts
Abrasive grit
Cans
Welding flux
Carburetor parts
Cardboard boxes
Ball and roller bearings
Steel slugs
Snap and slide fasteners
Screws
Melt samples
Steel balls
Bolts, nuts, rivets
Alumina



enough to amortize a \$16,000 investment in one year

Moves Bulb Ends—Systems for moving small parts in bulk can be efficient, too. A well-known maker of electric light bulbs moves one million threaded brass and aluminum bulb ends per day through a 4-in. ID steel tube. The firm's engineers designed the 80-ft long conveyor, which uses a low-pressure, high-velocity blower powered by a 3-hp motor.

This pneumatic setup is both simple and economical to operate and maintain.

Bulk-material air conveyors are installed to boost production efficiency. But slow handling of necessary paperwork and other items can nullify these gains. Many plants solve this problem with pneumatic tube-and-carrier systems. According to the Conveyor Equipment Manufacturers Assn., annual sales of this equipment jumped from \$2.2 million in 1947 to \$5.6 million in 1954.

Covers Wide Area—They range from relatively simple manual set-ups to fully automatic types. One of the latter, designed by Airmatic Systems, Inc., Fairview, N. J., serves the Bridgeport Brass Co., Bridgeport, Conn. The 4000-ft. system integrates the sales department, order department, the chemical and metallurgical laboratories, mill sample stations and the casting shop.

With the elimination of company messengers, these departments no



SMALL PARTS: Rubber-padded plastic carriers bring delicate instrument components from stock room to various assembly departments on demand. (Eagle Signal Corp. photo.)

longer have to wait for batches of orders, reports, mail or samples. Faster movement of documents and samples actually reduces paperwork and improves service to customers. The speedup saves the company an estimated \$25,000 annually.

It's as simple as dialing a telephone to send a message, sample, small part or a tool to any station in the system. The sender merely

sets the number of the receiving station on a pair of numbered dials on the carrier itself. Once this is done, the carrier is routed to its destination automatically, at about 25 ft per second. Samples of hot metal move in special heat-resistant carriers.

Moves Tools—At the 300,000 sq ft plant of J. L. Clark Mfg. Co., Rockford, Ill., pneumatic tube carriers convey small tools and machine parts from the maintenance department to production areas. This is only one of many such set-ups engineered and built by the Lamson Corp., Syracuse, N. Y.

Other leading builders of carrier tube systems for metalworking plants are Detroit's Grover Co., and the Standard Conveyor Co., N. St. Paul, Minn.

Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.

Bulk Conveyors Do These Jobs:

1. Unload materials from transport to storage.
2. Move materials from storage to process, or between processes.
3. Blend and mix materials en route to process station.
4. Weigh and batch materials en route to processing point.

5. Move materials from process to packaging, storage or bulk loading.

Carrier-Type Conveyors Do These Jobs:

1. Integrate in-plant processing of necessary paperwork.
2. Carry samples and lab reports in minimum time.
3. Deliver small tools and parts where needed.

Where New X-Ray Techniques Solve Old Shop Problems

Knowing what goes on within metals is basic to metalworking. The laboratory has many ways to do this.

One way is x-ray analysis—a precise but complex technique. Now an instrument eases the job.

With the diffractometer, you can solve shop problems conveniently and efficiently. The end result is a better product.

Practically every metalworking process changes the workpiece somewhat at a microscopic level and below. This means around and within the crystalline structure of the metal. It even involves the latticework of the metal crystal itself.

The diffractometer collects facts about these changes. The instrument already has helped improve a long list of metalworking processes. These include heat treating, welding, casting, forging, cold working, and other metal forming.

Work continues at University of Notre Dame, Notre Dame, Ind., to extend the diffractometer's usefulness. According to Dr. B. D. Culley, associate professor of metallurgy at Notre Dame, the instrument is making X-ray diffraction a more quantitative tool. In doing this, it's helping to answer many production problems.

Fig. 1 shows how the diffractometer works. X-rays of various wave lengths emerge from the X-ray tube, and bounce off the test specimen. In doing so, the X-rays bend (or diffract) to a greater or lesser extent. The spacing of the planes of atoms determines the diffraction angle.

X-rays diffracted from the specimen focus into a series of beams. This somewhat resembles the

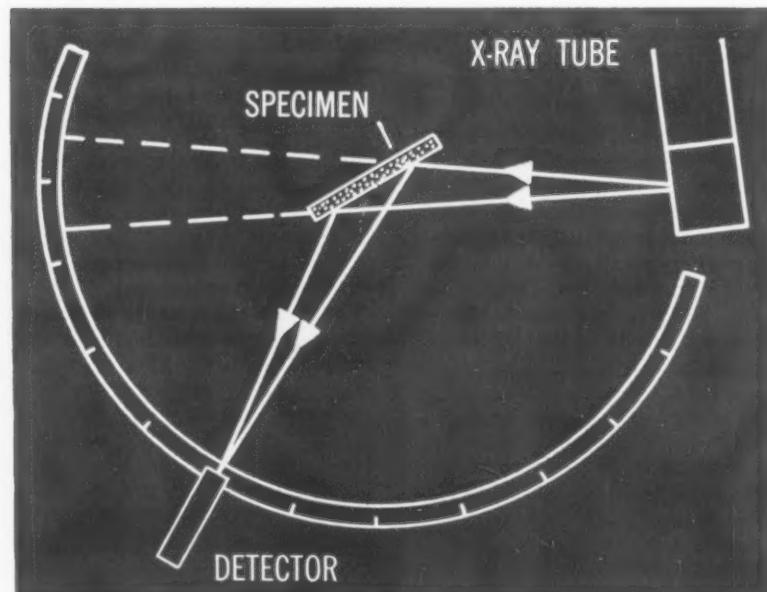


FIG. 1: X-rays strike specimen (center), and are diffracted in focused beams to the chamber wall. A detector moves around the wall, spots the beams, translates them into an inked curve.

focusing of visible light through a lens, though it happens for different reasons.

Detects X-rays—The focused beams strike the circular wall of the specimen chamber. An electrical detector slowly moves around the wall on a graduated circle. As the detector passes through the focused beams, they trigger an electrical impulse.

The output of the detector is fed to a moving strip chart. This records the intensity of the X-ray beam and its diffraction angle.

Fig. 2 shows a typical result. Such a graph gives at a glance both the intensity and the angular position of each diffraction "line."

At this point, you can begin to see why the diffractometer is convenient.

Does Two Jobs—The machine replaces, in one instrument, an

indirect two-step process. Both sets of facts could be gotten in other ways. But not at the same time, and not on the same equipment.

A powder camera can measure diffraction angle. But as the upper half of Fig. 2 shows, it gives little indication of X-ray beam strength. For this you go to a microphotometer. This measures intensity from the relative blackening of the film exposed in the powder camera.

Now look at what can be done with the diffractometer.

Practically all industrial metal products are composed of small crystals. The crystals are arranged in some special manner, not randomly. In rolled sheet, for example, most crystals tend to line up with a particular crystal plane parallel to the sheet surface. In addition, they also align themselves with a certain crystal di-

rection parallel to the rolling direction.

Properties Differ—This preferred orientation, or texture, leads to directionality of properties in the sheet. That is, properties measured along one line on the sheet may differ from those measured along another line. Such a condition can be good or bad, depending on the way the material will be later used.

In either case, finding and measuring the preferred orientation becomes an important matter. Orientation was formerly measured photographically. At best, the earlier results were qualitative: You knew something was there, but not how much. This because intensity of the diffracted

beam was estimated from visual inspection of the film.

The diffractometer can answer the orientation problem easily and accurately. Quantitative information is now available on the texture of many metals and alloys in sheet form. Work goes on now to develop the same data for drawn and rod, adds Dr. Cullity.

Much remains in this area for the diffractometer. Specifically, little or no work appears to have been done in quantitatively correlating the orientation of a metal with its properties.

Better Parts—Such work will answer questions like: (1) What orientation will result in the best properties in a part? (2) How must you control process variables to get the best orientation.

The diffractometer is helping in another area—that dealing with

phase changes in metals as they heat and cool. Here's a specific example.

Untransformed austenite in hardened steel may lead to changes in the size of the part. Retained austenite may decompose in service. This decomposition is accompanied by a change in volume.

Heat treatment will keep down retained austenite, if properly controlled. But to devise the right heat treatment, adds Dr. Cullity, you need to know how much austenite is present. There are two known ways to do this: (1) quantitative microscopic examination (lineal analysis), and (2) X-ray diffraction.

Measures Austenite—Under the X-ray, austenite differs in its crystal structure from martensite. (Martensite is the other main con-

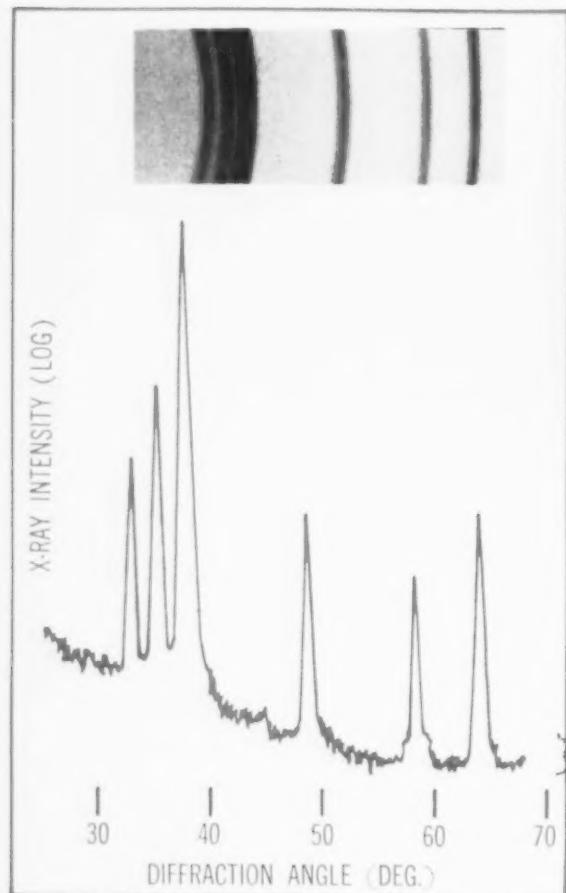


FIG. 2: Compare the photograph (top), taken with a powder camera, to the diffractometer graph (below). With the latter, X-ray beam location and intensity are precisely found and wavelength measured.

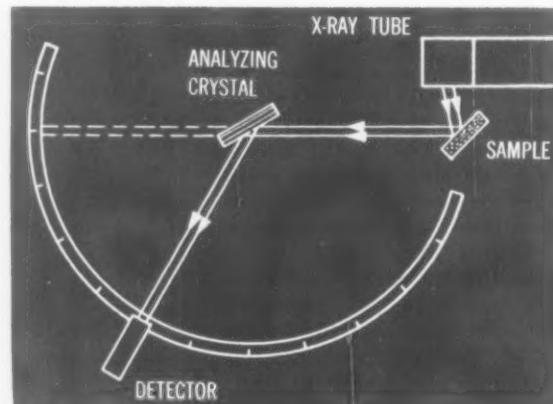


FIG. 3: To analyze alloys, modify the diffractometer to include an analyzing crystal. This permits determining chemical composition as in optical spectroscopy, but more easily and conveniently.

The Diffractometer answers questions on:

DRAWING: will cold worked parts fail?

WELDING: are residual stresses present?

DESIGN: what grain orientation in sheet gives the best part?

ROLLING: how do you roll to get the best grain orientation?

STEELMAKING: is alloy composition OK?

HEAT TREATING: is austenite retained?

MACHINING: need you stress relieve before finishing?

ELECTROPLATING: what causes failures?

stituent in the example.) They show different sets of diffraction lines. The intensity of the diffraction line varies with the amount of austenite present in the steel. The same holds true of the martensite.

This shows on the graph obtained from the diffractometer. The height of the curve represents the intensity of the X-ray beam. So by comparing the height on the curve measuring austenite with that measuring martensite, you find the percentage of austenite present.

The X-ray method is more accurate than lineal analysis. This is particularly so when the austenitic content is low. However, when you do run into low austenitic content, modify the setup shown in Fig. 1.

Do this by inserting a single crystal in the main X-ray beam so as to reflect only strong monochromatic radiation toward the specimen. This cuts the "background" radiation between the peaks on the chart. Lower diffraction peaks can be measured, and accuracy is improved.

detects Stresses—The effect of residual stress on parts in service is frequently argued. Sometimes it's harmful; other times it might be beneficial. But no one denies the need for knowing how high the stress level is.

The trouble lies in measuring the stresses. All known methods are complicated. All except the X-ray method end in destroying the specimen. Even this last is somewhat limited in that it measures only surface stresses.

But the diffractometer, reports Dr. Cullity, offers definite advantages over standard methods. These include remarkable accuracy and relative simplicity.

Atoms Squeezed—X-ray analysis of surface stress works this way. On an atomic level, stress changes the spacing of the planes of atoms in each metal grain. This interplanar spacing is precisely the thing that determines the angular position of a diffracted beam. So stress causes a shift in the position of a diffraction beam. The magnitude of stress can be computed from this shift.

Now comes the advantage of the diffractometer.

Even quite large stresses cause only a very small shift in the diffraction line. So utmost care in measuring line position is needed for good accuracy. With unhardened steel, this isn't difficult using conventional X-ray diffraction equipment. The lines depicting unhardened steel on a diffraction photograph are fairly sharp. Their position can be measured with fair accuracy.

But the corresponding lines for hardened steel are more troublesome. Hardened steel constituents are nonuniformly strained. They produce a diffraction line so wide that it's practically a broad blur. Thus it is virtually impossible to visually locate the line's center with precision.

Highly Accurate—With a diffractometer the situation is different. The curve is such that its center can be located with remarkable precision. This is readily done by various geometric methods.

So hardened steels are at last amenable to stress analysis by X-ray diffraction.

Analyzing metals and alloys for chemical composition is admittedly basic to steelmaking. Fluorescent X-rays have much to commend them for this purpose. The method is fast and nondestructive. It can detect most elements of interest to metallurgists. The light elements, unfortunately, are exceptions: Examples of these are boron, carbon, nitrogen and oxygen.

But within these limits, X-ray analysis is a valuable tool.

Checks Alloys—Fluorescent analysis is essentially X-ray spectroscopy. It's correct here to call the instrument a spectrometer, points out Dr. Cullity, although the same diffraction principle is involved. The process is akin to optical spectroscopy, but actually is simpler.

Fig. 3 shows a fluorescent X-ray setup. The X-ray tube resembles that used in normal diffraction, but is more powerful.

In the optical method of spectroscopy, an arc or spark heats the sample, and excites it to white hotness. In the X-ray method, X-ray radiation replaces the heat energy.

To Find Alloy Makeup

Test specimen

Remove strip graph

Get out your reference chart

Match graph against chart

with rock salt crystals;
diffraction lines at 39.5° and
 43.8° show manganese;
diffraction lines at 43.5° and
 47.8° show chromium

Similar line groups exist for
most elements

Height of graph peak for each
element relates to percentage
present.

Emits X-rays—X-rays excite the sample to emit fluorescent radiation. This radiation is made up of only two or three wave lengths for each element in the sample. Contrast this with the multitude of wave lengths seen for each element in optical spectroscopy.

Fluorescent X-rays from the sample hit a single crystal mounted at the center of the diffractometer. A sodium chloride crystal is commonly used.

Each wave length in the fluorescent beam is diffracted at a different angle from the crystal. The electrical detector, moving along its graduated circle, measures the intensity of one wave length after another.

Calculate Contents—The resulting chart record looks much like the diffraction pattern of Fig. 2. But now each peak depicts the wave length of a particular element in the sample. You calculate the quantity of each element by comparing the peak height with that resulting from samples of known composition.

Fluorescent analysis is best suited to finding elements present in large amounts. High alloy steels and jet engine superalloys fall within its scope. The method cannot compete with optical spectroscopy in detecting minor constituents in metallic alloys.

High-Nickel Electrode Welds Most Dissimilar Metals

By joining dissimilar metals, you use high-cost materials only where you really need them. This can save big money.

But such joints often call for special equipment and electrodes. So up climb your costs again.

Shops now report using a high-nickel-electrode that joins most dissimilar metals the easy way.

■ You can join dissimilar metals with standard welding techniques. A high-nickel electrode permits this.

It will also help reduce the cost of welding two dissimilar metals together. This is so for three reasons.

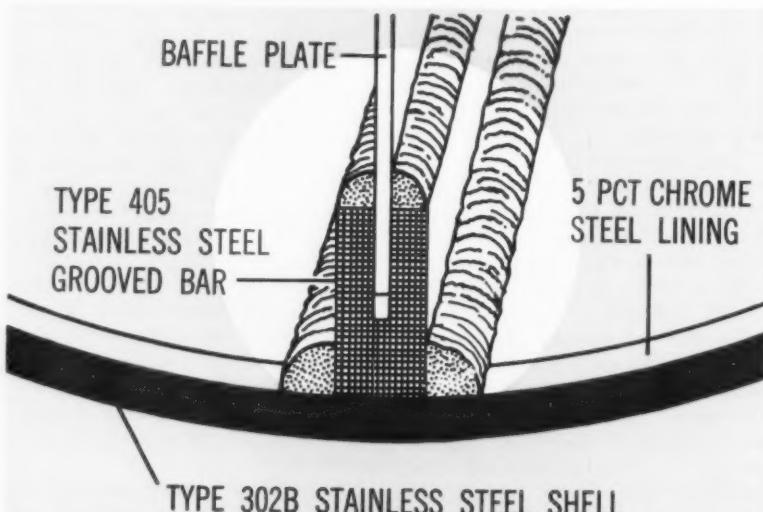
First, you need only one electrode type to weld up to 90 pct of all common dissimilar metal pairs. A sizeable cut in electrode inventory can result.

Second, operators can weld two different metals without special equipment or techniques. In addition, pre-weld and post-weld heat treatment can at times be avoided.

Lower Costs—Third, it's possible to use more dissimilar metal joints, and save on the lower material costs they imply. For example, in high temperature service you'll continue specifying heat-resistant steel. But to this you can join a less costly metal suitable for use outside the high-heat zone.

The prospect of high-strength, crack-free dissimilar metal joints has a strong appeal. It now appears that such joints are not beyond the resources of the average weld shop. Use of nickel alloy electrodes accounts at least partly for this turn of events.

Welds with the high-nickel electrode show mechanical properties



that compare favorably with those of the base metals.

Shop Tests—Table I summarizes shop and laboratory experience to date in joining 21 common dissimilar metal pairs. Test specimens were not heat treated before or after welding. The nickel alloy electrode used in all cases is Inco-Rod A, developed by International Nickel Co., Inc., New York. Dissimilar metal members include austenitic and ferritic stainless steels, low-alloy steels, mild steels and high-nickel alloys.

Work beyond that detailed in Table I reveals other advantages.

Corrosion resistance of the weld deposit equals that of many parent metals. Alloy composition is controlled to eliminate carbide formation and carbon migration in the joint. The weld deposit is not subject to sigma phase formation.

Joint strength and weld ductility show up well compared to the parent metals. In high temperature service, weld properties approach those of Inconel. The weld deposit has good impact properties at very low temperatures.

TOUGH JOINING JOB: Four different metals (three workpiece materials plus the high-nickel weld bead) join together without cracking. On this design, no preheat was needed.

No Porosity—X-ray analyses show most joints completely free of porosity. Where porosity is present, it falls well within welding code limits.

Welding technique with the nickel-chromium electrode is like that in joining stainless. Arc length, angle of electrode, rate of travel are normal. Any of the standard arc welding processes is suitable. Reverse polarity, dc current is used at the amperages shown in Table II.

The electrode welds in any position. A spray-type arc results. Slag flakes off just as well as with other high quality electrodes. The weld bead lays smoothly with close ripples.

Properties Differ—Typical of the problems in dissimilar metal joining are those met in welding mild steel to AISI-SAE Type 304

Table I:

Typical Test Data For Dissimilar Welds Using High-Nickel Electrode

Materials	HARDNESS SURVEY ACROSS JOINT, Rb										LONGITUDINAL BEND TESTS	TENSILE STRENGTH psi	LOCATION of FAILURE	
	Left member					Right member								
Left	Right	2 in.	1 in.	1/16 in.	Fusion Line	Weld	Fusion Line	1/16 in.	1 in.	2 in.	1/2-in. gage	1-in. gage		
Mild Steel	304	67	67	79	88	83	84	90	82	77	38	30.4	71,900	Mild Steel
Mild Steel	405	67	66	79	83	79	90	81	80	80	42	32	67,100	Mild Steel
405	405	85	88	85	99	80	94	90	87	86	39.2	33	79,800	405
Croloy	347	75	76	87	100	79	84	89	84	82	41	31.4	84,100	Croloy
(2 1/4 Cr-1/2 Mo.)														(2 1/4 Cr-1/2 Mo.)
Mild Steel	330	67	69	80	85	77	77	82	83	77	35.3	29	63,600	Mild Steel
405	316	76	75	76	84	76	82	87	75	74	38	32	81,000	405
Mild Steel	316	67	66	81	88	81	82	88	80	77	36.7	28.6	69,500	Mild Steel
Mild Steel	310	65	65	77	84	78	87	92	92	92	34	28	69,900	Mild Steel
304	410	74	78	87	86	79	105	87	82	81	35	25.7	80,000	410
Mild Steel	347	65	65	76	85	79	85	91	85	83	38	30.3	69,700	Mild Steel
Croloy	304	77	77	88	100	83	89	90	78	75	34	26.3	83,000	Croloy
(2 1/4 Cr-1/2 Mo.)														(2 1/4 Cr-1/2 Mo.)
405	304	90	90	90	96	82	83	87	81	74	33.3	27.7	91,400	304
405	310	78	79	83	90	80	90	91	90	91	34	28.7	73,400	405
405	347	73	75	78	85	81	87	91	88	82	34	28	72,000	405
405	330	72	74	77	89	78	78	80	78	77	34	25.3	81,200	330
Mild Steel	Croloy	72	73	80	85	79	102	78	77	76	30.6	24.8	68,600	Mild Steel
Mild Steel	410	73	74	77	82	85	104	84	82	81	38.4	29	70,700	Mild Steel
Hast. C	316	94	93	96	97	85	98	91	83	82	38.8	28.3	90,500	316
Monel	410	69	69	78	78	80	104	85	82	81	38.4	30.6	81,830	Monel
Inconel	347	74	75	85	83	82	86	89	82	81	33.3	25.2	95,100	Inconel
Inconel	405	75	75	87	85	84	97	86	86	86	43.1	28.3	90,800	405

NOTE 1. Elongation measured after guided bend plus free bend.

stainless. First, the two metals differ in chemical composition and melting point. They also are far apart in certain physical and mechanical properties.

The heat conductivity of Type 304 austenitic stainless is about 50 pct that of mild steel. Type 304's coefficient of thermal expansion, however, is at least 50 pct greater than mild steel's.

As a result, heat tends to concentrate in the stainless member. It reaches welding temperature before the mild steel part. So one member is hot enough for deep penetration or smooth flowing beads, while the other is not.

To confuse the picture more, current requirements differ. In welding stainless to stainless, workers normally use about 10 pct less current than with mild steels.

Avoid Buckling—After welding, there's still possible trouble. Differences in the cooling rates of mild steel and Type 304 stainless can cause cracking or buckling. This is especially true when joining parts of unequal thickness.

Such problems previously encouraged preheating and post-

heating the dissimilar metal workpiece. The nickel-chromium electrode, it's claimed, can sometimes change this. Weld metal laid down by the nickel alloy electrode is relatively compatible with both members of the dissimilar metal joint. That means less danger of cracking and buckling than before.

Fabrication of a 3-ft ID pressure vessel serves as an example. Welded with conventional electrodes, a preheat of 500°-600°F was needed for proper penetration. The nickel-chromium electrode was tried because of cracking problems and a redesign that included a dissimilar metal joint. Satisfactory joints resulted without preheating.

Skip Preheat—In some instances, weld tests are needed to decide whether or not preheating can be eliminated.

High temperature service offers another area of potential use for dissimilar metal workpieces joined with these electrodes. Take heat treating furnaces, for example. The metal of the furnace retort must have good mechanical prop-

Table II

Recommended Amperages*

Electrode diam, in.	Current, amp
3/32	40-65
1/8	75-100
5/32	90-130
3/16	110-150

*Use dc, reversed polarity current. For vertical and overhead welding, lower current 10-20 amp.

erties at 2000°F and higher. But part of the retort is not exposed to the furnace atmosphere. That section could be made at less cost from low alloy steel.

In the past, welds between mild steel and the heat-resistant retort alloy could not withstand the temperature gradients and stresses met in service. A nickel-chromium electrode now can make these joints feasible. Furnaces may cost you less as a result.

When Is An Underdrive Press A Good Buy?

By E. J. Egan, Jr., Machinery Editor

An underdrive press isn't any cheaper or faster than its overhead drive counterpart.

But if you have basement room for the low-slung mechanism, it can save you important money.

For example, you can reduce main floor ceiling height. This cuts building costs, brings down fuel bills, too.

■ What reasons would a firm have for buying a giant mechanical press of the underdrive type? Such presses are not in what you'd call common use. In fact, they're far outnumbered by the overhead-drive variety.

Still, there are times when the choice of an underdrive unit is the only logical one a company can make. Happily enough in these

circumstances, it's also far and away the most economical choice.

Such was the case recently at the Parish Pressed Steel Div. of Dana Corp., Reading, Pa. A major expansion program to increase production of passenger car frames called for a brand new building, including a new 2400-ton press to make side rails.

The press finally chosen was a Bliss underdrive mechanical. Some idea of its size can be gained from the fact that it weighs 1,200,000 lb, is 31 ft, 10 in. wide, and has a bed area 6 ft by 20 ft.

Split Level—Of its overall height of 36 ft, only 19 ft, 8 in. of the press rises above floor level. The remaining 16 ft, 4 in., containing the drive mechanism, descends beneath the floor into a pit 22 ft deep.

Actually, there were many reasons why Parish management spec-

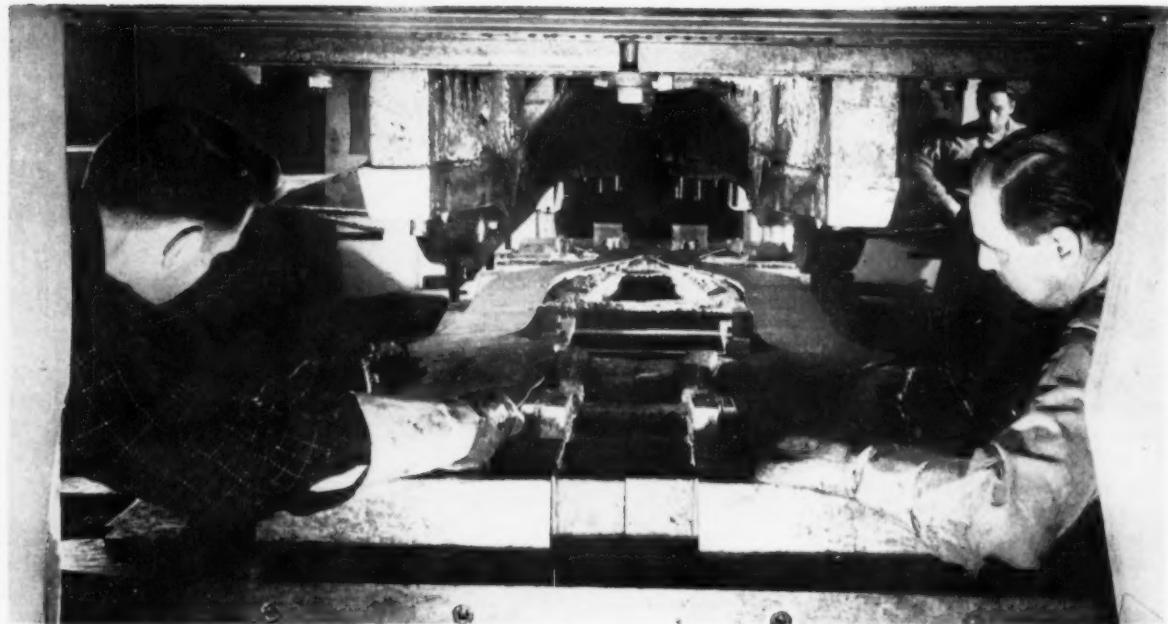
ified that this huge unit should be an underdrive type. But basically, they can be grouped under three headings: topographical, financial and—curiously enough—psychological.

Topographically, the only available location for the new frame plant was a hillside area, not large enough for a one-story building that could house all the necessary operations. But it was an ideal setup for a two-story building. It also meant that only a minimum of excavating would be needed to dig an underdrive press pit in the lower level.

Assemble Downstairs—Sections of the plant are still under construction; others, including the major press-working areas, are in full operation. As it now stands, the 189-ft wide, 900-ft long main floor will be devoted primarily to forming various frame compo-



FROM BOTH SIDES: Two-man teams at front and rear of press feed these contoured steel blanks to the rail-forming die with a quick lift.



THE MAIN JOB: Prime function of the press is to form two side rails at each downstroke. Easier,

quicker repairs to the underdrive mechanism mean more production time.

nents, also to the spray painting of finished frames. The 340 ft by 189 ft basement level will house several frame-welding assembly lines.

Quite naturally, the saving involved in building a two-story plant on a hillside was a major factor in the decision to buy an underdrive press. On the other hand, the design of the press itself contributed still more savings. For example, the roof of the building is only 40 ft high, and crane runways are only 23 ft above the floor level.

Low Ceiling Saves—If the building had been designed to house an overdrive press of equal capacity, the roof would have had to be about 55 ft high. Crane runways, in turn, would have been about 35 ft above floor level. Thus the 15 ft of height saved meant considerable economy in construction materials, time and labor cost.

Over the long term, this lower height will also mean savings in the use of paint, glass and other maintenance materials. But even more important is the fact that a 40-ft high working area can be heated much more efficiently and economically than one with a 55-ft ceiling.

Speed Handling, Too—Parish officials point out still another economy due to the low height of the new plant's main floor: the speed-up effect it has on production, especially where crane-handling is involved. Between the firm's old press shop and the new one they have a direct comparison of the speed and skill with which an operator can maneuver an overhead crane.

The evidence is quite clear that, from a runway only 23 ft high, an operator has a decided advantage over one who must operate from a height of 35 ft. At the lower level, the operator can see better to hook up and drop-position his loads. Moreover, because of the shorter cable span between crane cab and floor, there is less tendency for loads to swing pendulum-fashion. Thus the low-level operator can hoist and move his load at greater speed and bring it to a stop more quickly.

Add Press Savings—The foregoing financial considerations all had some bearing on the decision to buy an underdrive press. But they concerned only the new building and its operating efficiency. Other economy factors bore more directly on the press itself.

And these added reasons went far beyond the matter of initial cost. Actually, company officials say that the delivered price of a new overdrive or underdrive press is a "stand-off." But looking ahead from that point, they do expect that the underdrive unit will be most economical to operate.

For one thing, they expect the press to require little more than routine care. It has ample capacity to form side-rails without strain. In addition, the underdrive mechanism is between the feet of the supporting members of the press instead of high above these supports.

This design feature is expected to cut down vibration, which should in turn, reduce both the number and length of shutdowns for maintenance and repairs.

Runs Quietly—Several months of operating experience prove that the press is remarkably silent and vibration-free. This is due partly to its basic design and partly to the insulating pads on which it rests. Plant engineers estimate that these pads dampen out about 50 per cent of the normal vibration.

Another important item is that repairs to the drive mechanism will not interfere with production

or traffic operations on either the main or sub floor of the plant. All of this work can be performed in the pit area, as can be seen from an accompanying photograph. There is no need to erect repair scaffolds or to trail power cables across busy production areas.

The convenience of working in the underdrive pit should bring another cost-saving benefit as well: less time required for the inevitable job of replacing worn clutch and brake linings.

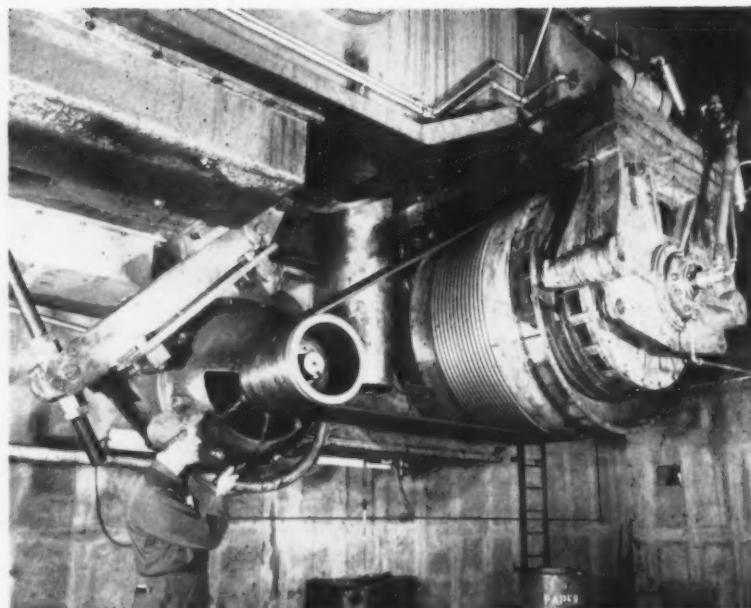
In addition to the building advantages and operating economies already described, the management foresaw certain psychological gains in specifying an underdrive press. These cannot be evaluated in dollars and cents as readily as the other factors. But they are none the less tangible.

Workers Feel Safe—For instance, there is little doubt that the men charged with maintaining or repairing the drive mechanism of the new press will work more efficiently from the solid floor of the pit than they would from a 30-ft high scaffold. With a solid footing underneath, there aren't nearly as many compelling reasons for a worker to concentrate on keeping one hand for the job and one hand for himself.

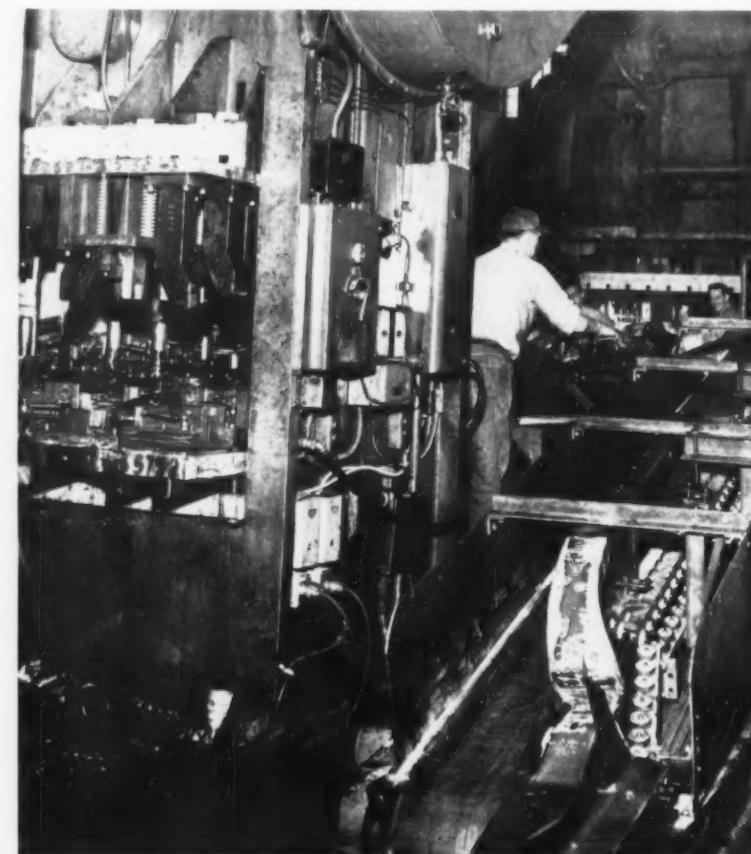
In this connection, it may bear repeating that a similar psychological hazard probably exists where some crane operators are concerned. Parish officials consider it important that crane operators in the new plant, working from a relatively low 23-ft height, feel much surer and safer about their load-handling duties.

Dollar for dollar of delivered cost, and stroke for stroke of rail-forming potential, the new press is neither cheaper nor faster than an overdrive unit of the same rated capacity.

But there is every indication that the lack of initial cost advantage will soon be outweighed by operational savings. At the same time, the ease and speed with which the giant press can be maintained should result in significantly greater output of stampings over a given period of time.



SOLID FOOTING: Maintenance and repair personnel working in the press-drive pit don't need tall ladders or scaffolds. This means that they can work faster, and with a greater feeling of security. Moreover, work done here is out of the way of busy traffic and other operations.



GOING DOWN: A conveyor (right) brings formed side rails from main floor to basement for final frame assembly and inspection.



FAST IDENTIFICATION: Chain links are banded at five-foot intervals with printed, color-coded tape.

Mark "Hard-To-Label" Parts

Many a hard-to-label product goes off to market today carrying no permanent identifying marks.

A simple, permanent marking system would help make product name, grade or quality, and size instantly identifiable to users.

Here's how one manufacturer licked problems of labeling chain.

■ How do you go about labeling and identifying a product, permanently, where standard marking procedures won't work?

Unmarked products—particularly where they may vary in size or grade, and where differences are not apparent at a glance—can raise problems of possible misuse in the user's plant. And your anonymous product does little to help establish your reputation in the user's mind.

Marking has been a particular problem with makers of chain.

Company Knew Needs—American Chain and Cable Co., York, Pa., knew what they wanted in a labeling system. They wanted one which would (1) clearly identify the grade of chain, (2) permit the use of a trademark and, (3) last

indefinitely, despite rough wear-and-tear. Stamping was a possibility, but might weaken the links. Simple color-coding alone was unsatisfactory for several reasons.

The company now satisfies all three labeling requirements with strips of pressure-sensitive tape. Chain is tagged every five feet with printed tape bands carrying trademark and grade of product.

Tape is also colored so grade can be instantly spotted.

Specially Tailored—Minnesota Mining & Manufacturing came up with the special tape, which combines abrasive resistance, color and printability. It's a special laminate, consisting of an acetate fiber tape covered with a polyester tape. The acetate fiber comes in 12 colors. Polyester tape protects the printed surface of the acetate fiber.

American Chain has the tape laminated and printed by a regional tape printer and converter.

Applying the tape properly presented other problems. Chain picks up a certain amount of grime and oil during manufacture, the oil being added to prevent rust. Since the tape will stick to itself as well as clean surfaces, the answer was found in putting tape on in a flag tab, with the adhesive face-to-face.

Machine Applies It—To save time, the company then worked out an automatic tape applicator. This applies tabs quickly and cleanly every five feet on chains of a quarter-inch size or under.

The machine worked out for this has to have a continuous supply of chain available at the tape-applying head. This is accomplished with two spring-mounted boards, one controlling the amount of chain being fed, the other the amount of taped chain which is piled on pallets for removal. The boards are equipped with contact points which operate electrical motors.

When chain piles up on the input board to a certain weight, the motor stops until the taping unit pulls off several lengths.

Loads On Pallets—The second board allows a certain amount of already-banded chain to accumulate. Then it cuts in a motor which pulls the chain up and lays it on a loading pallet in a predetermined pattern.

Larger chains are banded by hand. Workmen use a special cradle device attached to a rotating drum head to pull the chain across the work area. They then apply short bands of tape at five foot intervals, just as with the smaller sizes.

Foundry Brainstorms Its Way Around Production Knots

By George Matuch, Jr., Production Manager, C. I. Capps Co., Inc., Jacksonville, Fla.

Despite modern advances, you still have to bring as much art as science to bear in licking tricky metalworking problems.

And generally, the earlier you bring on that old-fashioned know-how, the better. Particularly on short-run, high-ticket items, where price is tied down tight and you've little leeway for error.

Here's how one foundry pre-planned its way around some tricky problems.

■ Taking on a contract for the production of hard-to-make metal products is one thing. Delivering the goods—at a profit—is sometimes quite another. In the foundry business particularly, it's the experience you can bring to bear on the tough problems that makes the big difference.

Case in point: A Navy contract calling for 26 non-magnetic aluminum-bronze rudders for ocean-going minesweepers.

The C. I. Capps Co., Jacksonville, Fla., took on the contract. They did so knowing that the rudders, each weighing more than 2,500 lb, presented some tough

foundry and machine shop problems. And these would have to be licked with a minimum of rejects. The small run—and the fact that the contract was taken at a fixed price—left little leeway for error in getting the job out.

Rudder Assembly—The basic rudder assembly consists of a leading edge weighing 1650 lb, a trailing edge weighing 130 lb and a 47-lb bottom edge. These units are cast in aluminum bronze conforming to specification MIL-B-16033, Class 2. After casting and machining, units are welded together by the shielded-arc, bare

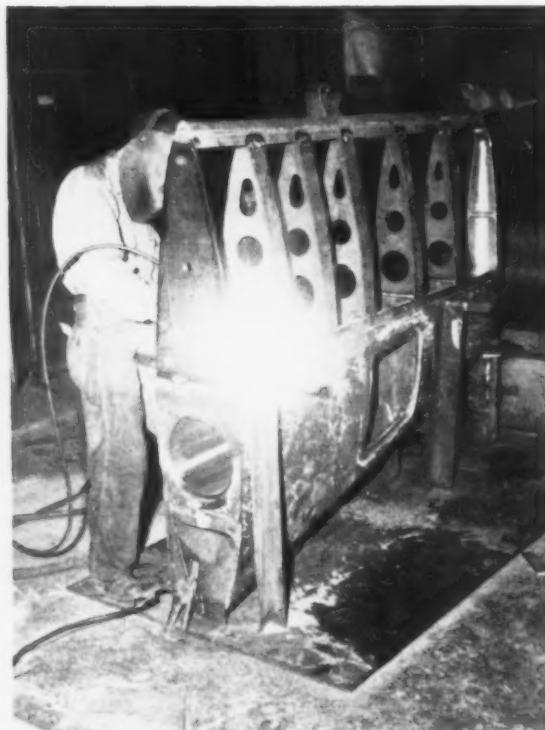


FIG 1: Shielded-arc, bare metal wire technique is used in welding minesweeper rudder components together into one rigid, watertight assembly. Completed rudder weighs more than 2500 lb.

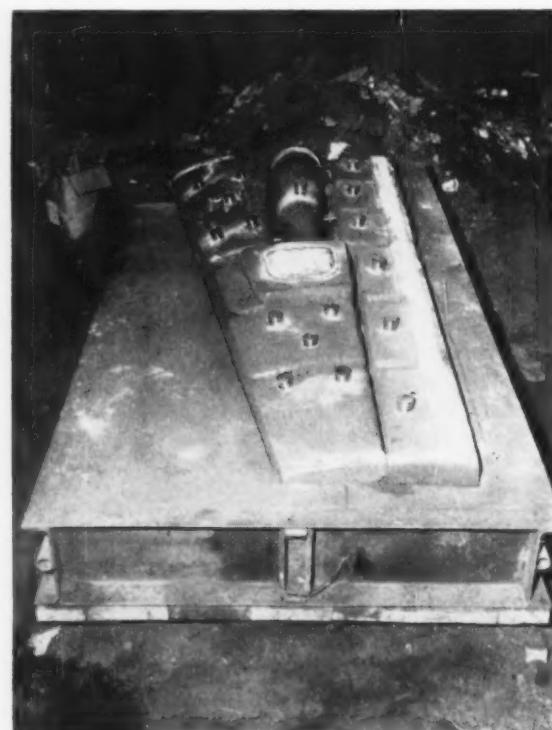


FIG 2: Preventing core shifts on leading edge castings was special problem. Drag side of large green-sand mold shows type and positioning of specially designed aluminum bronze chaplets.

wire technique. Finally, they're formed into a rigid, completely watertight assembly by welding up $\frac{1}{4}$ -in. aluminum-bronze web and skin plates.

In operation, the rudder is controlled by the rudder stock, a piece which is lowered into a taper machined in the leading edge casting. This locks into a keyway. Perfect interchangeability is a must, so that in emergency, rudder or rudder stock could be replaced.

Breaking It Down—A preliminary brainstorming session of all departments involved narrowed the problem down to three major difficulties: (1) preventing core shifts, (2) maintaining correct taper and, (3) insuring accurate keyseating.

The limited area available for core prints on the 1650-lb castings, and the correspondingly large number and size of the various openings, made it clear that core prints alone could not prevent core shifts and assure reliable anchoring. The difficulty is apparent in Fig. 2. The drag side of the large green-sand mold has been torch-dried in this photo, and is ready to receive the cope.

Chaplets were the natural answer. But on pouring, the hot metal might tend to lift and float the cores, or to shift or collapse copeside chaplets.

Ordinary chaplets would burn away in a hurry. So chaplets (Fig. 2) were made of the same aluminum-bronze as the rudder.

Fuse And Disappear—The chaplet design leaves enough metal for strength throughout the pouring period, but has edges thin enough to fuse with the liquid metal. Wall thickness of the casting varies in different sections from $\frac{1}{2}$ to $1\frac{1}{4}$ in. Chaplets were therefore turned and parted off to three different lengths and the pattern was marked with positions at which ram up cores were needed to anchor them.

As added insurance, a pointed projection was left on the chaplet which could be sunk into the cores. This made shifting of the chaplet all but impossible.

Bore Problems—The tapered bore in the leading edge casting was to extend down vertically $3\frac{1}{2}$ in. from the top of the rudder.

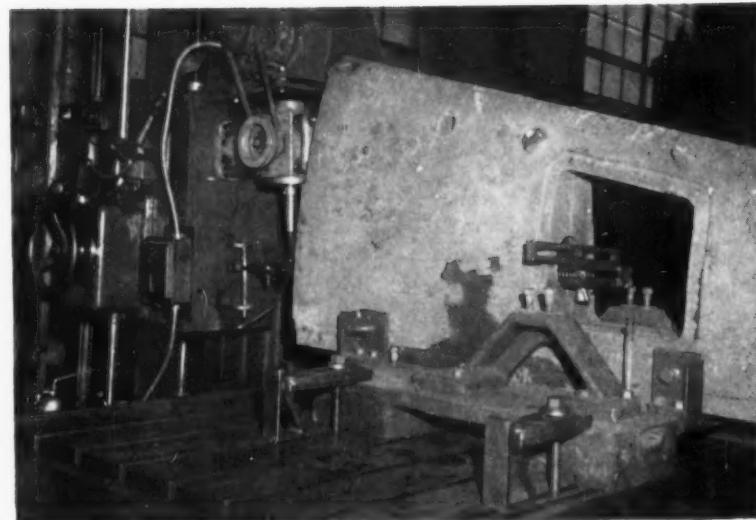


FIG 3: This setup for cutting the tight-tolerance, interchangeable keyways permits intermittent production. Work can be removed from machine, continued later without affecting accuracy.

der. Its center line was to run 3 ft 3 in. from—and perpendicular to—the trailing edge. This bore was designed to house the forged rudder stock. Complete interchangeability of rudders and stocks was specified.

This meant tooling had to produce—and reproduce—identically tapered holes. Taper had to be held within $+0.000$ and -0.002 in. at $1\frac{1}{2}$ in. per foot of length.

Capps managed this by:

(1) Facing the edge of the rough casting so it paralleled the bore, (2) machining a holding fixture and keying it to the boring mill table, (3) turning the boring bar to the correct taper on the same lathe used to turn taper on the rudder stock, (4) milling the slot for the tool parallel to the tapered OD of the bar and, (5) bolting the bar to the boring mill spindle and a self-aligning bearing to the holding fixture to carry the free end of the bar.

In Operation—Boring was done with the cutting tool run back against the flange of the bar. The bar was run into the cored hole to a depth where the tool would remove the necessary amount of metal. Subsequent cuts were made by running the table carrying fixture and casting closer to the head.

This arrangement permitted re-

moving work from the mill at any point, then picking the job up again without delay or error.

Keyseating Requirements—Keyseating called for sidewall keyway dimensions to be accurate within 0.003 in. Positioning had to be exact for interchangeability. To further complicate things, the keyway is open at the small end of the bore, closed on the large end.

The setup shown in Fig. 3 solved the problem. It consists of a cast iron plug turned to rudder bore dimensions and T-slot-joined to a cutter carrier bar. An assembly consisting of a bearing-mounted end mill, a chain drive and an air line for blowing out chips at the keyway was installed. A Master Mill attachment on the boring mill head furnished cutter power.

Play-By-Play—Operating sequence calls for (1) installing bar and plug in the finished bore of the rudder casting (the bar is free-floating in the slot, while the plug is held snug by a strongback across the small end of the bore); (2) attaching the bar to the pulling rod and the drive shaft, and bringing the table up to the face of the mill; (3) installing the end mill in the bar.

Two cuts are taken, the first with an undersized cutter, the second with the correct finished size.

Resistance-Heat Titanium For Better Brake-Forming

Not least among the factors holding titanium back from wider commercial acceptance are fabricating difficulties.

Metalworkers are adding a good bit to their knowledge through working with titanium on mainly military applications.

This plant threw a couple of new ideas into their standard mix to improve brakeforming operations.

■ Detail parts made of titanium alloy can now be brakeformed, part after part, to the same predetermined angle of bend.

This is possible with an improved production-forming method which calls for resistance-heating detail parts to bring them up to temperature at just the right moment for forming. Results are consistent and reproducible over a 100 to 1400°F range.

Conventional tools are used.

Two Wrinkles Added—The Martin Co., Baltimore, worked out the process which, essentially, gives tighter control over forming temperatures by more closely integrating heating and forming operations. The plant's manufacturing engineers added two new wrinkles to the conventional setup—a portable resistance heating unit with associated temperature control and a special holding fixture.

The company designed and built the resistance heating unit itself. This is of 50 kva capacity. Temperature control is through a Leeds & Northrup Rayotube radiation detector and a Speedomax recording controller. These translate infrared rays emitted by the part into degrees of temperature, as the basis for control.

Completes Cycle—Regulation of the resistance heating equipment is through a GE Reactrol Unit,

completing the control cycle.

The second innovation is a portable holding fixture. This is equipped with quick-acting clamps. It can be positioned according to the length of the detail part, which can run to 8 ft.

This holding unit is unique in that its power leads, which connect it to the resistance heating unit, have to be attached at only one end. From this point, aluminum bus bars run the length of the fixture, making a second origin of lead-in coils and wire unnecessary.

Critical Moment—The forming process reaches a critical point when current from the resistance heating unit transfers through two aluminum strips, on through the portable clamping fixture, and thence to the titanium detail part. The aluminum strips are welded to the titanium detail parts by a method of Martin's own devising. By carrying current to the part

at the exact time that the brake-forming operation takes place, the high temperature need be held for only the minimum time necessary for bending.

Aluminum strips make it unnecessary to attach electrical leads directly to the detail part. Also, they're pliable. This insures correct forming of the part, since the aluminum can offer no interference during the process.

Separated Before—Previous methods of brake-forming titanium alloys at 1000°F and higher have involved separate heating and forming operations. Variations in forming temperatures—*inherent in earlier methods*—have resulted in variations from one detail part to the next.

The improved method uses the same tools used with aluminum. For electrical insulation, Martin puts a thin coating of a ceramic cement material on both the die surfaces and back gage.



FINISHED PART: Operator holds titanium detail part after it has been resistance-heated and brakeformed. Aluminum strips, welded to part to carry heating current, are still in place.

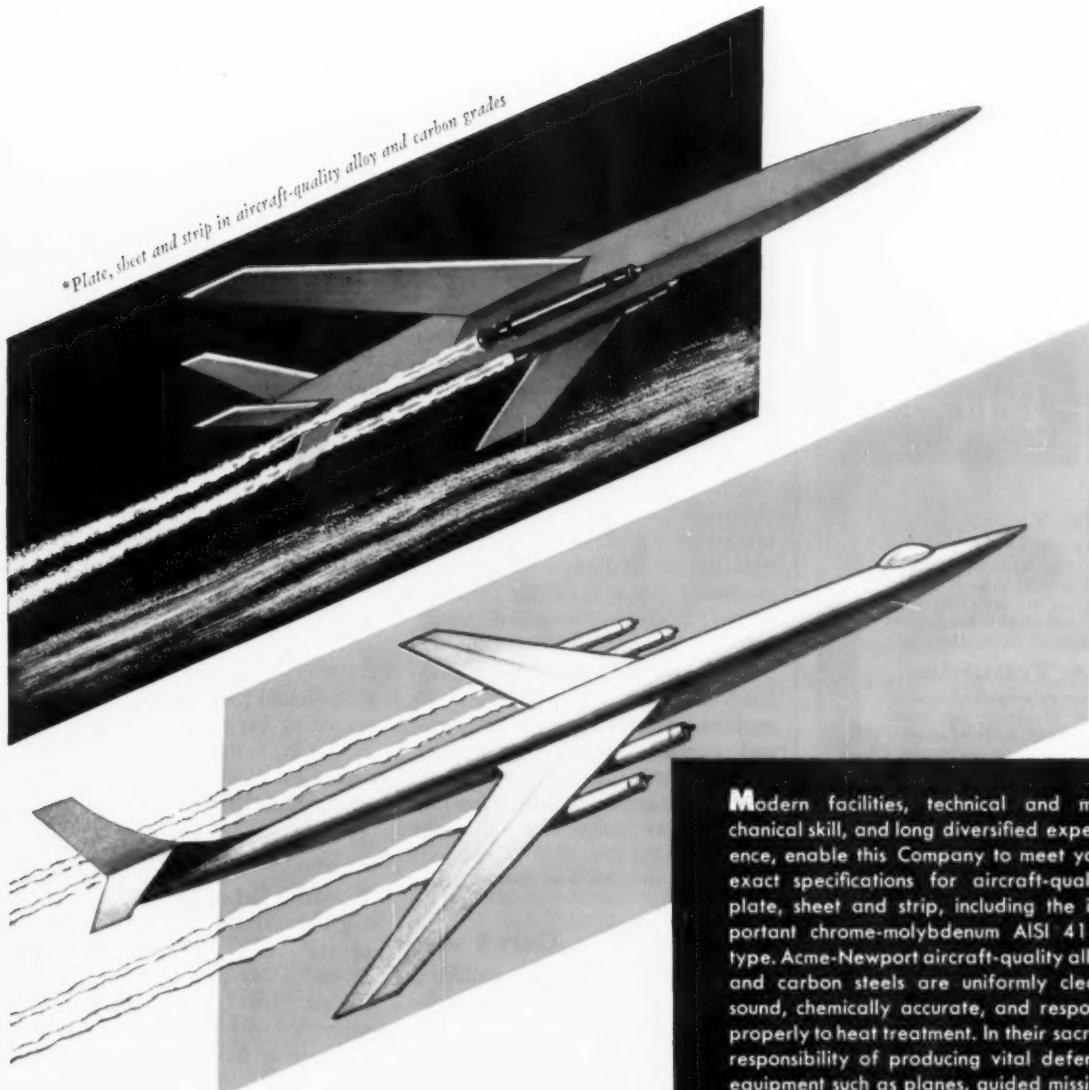
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For free copy circle No. 1 on postcard, p. 137

Rubber Roll Care

The maintenance of rubber rolls is the subject of a recently published technical report. A handy table lists faults and causes of faults commonly found in rubber rolls, together with recommended treatments. It presents a discussion of maintenance techniques. The publication recommends answers to problems involving grooves, cracks and surface damage, lubrication, cleaning, transportation and storage. Emphasized is the necessity for regular inspection. *Rodney Hunt Machine Co.*

For free copy circle No. 2 on postcard, p. 137

Cutoff saw

A simplified cutoff saw combining high precision with operating economy is announced in literature now available. It describes the new saw as simple to operate and easy to set-up. Among its listed features is unusually short set-up time. The saw sets up for any run, including changeover from ferrous to non-ferrous metals, in only 1½ minutes. It cuts up to $\frac{3}{4}$ -in. bar stock in steel for production runs, and larger stock for tooling or short runs. It also cuts up to 1½-in. in non-ferrous bar stock for production runs. *Kenco Mfg. Co.*

For free copy circle No. 3 on postcard, p. 137

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 137.

Dock ramps

Power-operated, automatic leveling dock ramps for either air-oil (air compressor) or electric operation are depicted in a 6-page bulletin. Hinged to the dockedge, they provide a "gangplank" between the dock and the bed of a truck or trailer. The projecting edge of the ramp has either a fixed lip or a hinged "throw-over" lip as preferred by the user. An automatic safety switch prevents the ramp from dipping suddenly if the vehicle should pull out from under the lip. They have a capacity rating of 20,000 lb, both for "roll over" and "cross over" loads. *Globe Hoist Co.*

For free copy circle No. 4 on postcard, p. 137

Filter

Operations of automatic, self-cleaning tubular screen vacuum filters appear in a four-page brochure. These, it says, offer advantages in saving floor space. High flow capacity with filtration for low micro-inch finish requirements is also listed. An optional precoat feature permits the use of diatomaceous earth for complete filtration. Schematics show filtering and backwash cycles. The filters are equipped with conveyor flights for automatic removal of filtered solids. Units have application in the filtering of coolants, cutting oils, rolling oils, solvents and all liquids requiring the removal of minute particles. *Industrial Filtration Co.*

For free copy circle No. 5 on postcard, p. 137

Steel castings

How to buy steel castings for value and profit is told in a file-folder. Containing 20 pages, the new folder includes a complete description of 12 metals available for casting at one manufacturer's plants. Chemical, physical, and general properties are given for each metal, together with special heat treatment data. A hand glossary of foundry terms for buyers and users of castings also appears. Information is included on the firm's finished products division; this branch delivers steel castings machined and finished, ready for final assembly. *Dodge Steel Co.*

For free copy circle No. 6 on postcard, p. 137

Thermostat

Using photos and text, a bulletin describes a direct acting control that protects laboratory and industrial equipment from exceeding preselected temperature limits. The control, available in temperature ranges up to 800°F, activates automatically when it reaches an excessive temperature. Once tripped, the cut-out remains in an open position until it is reset manually. It is intended for use in electrical equipment only. *Robertshaw-Fulton Controls Co.*

For free copy circle No. 7 on postcard, p. 137

Limit switches

Twenty-one contact arrangements are listed in a catalog on machine tool limit switches. It describes the housing, contact arrangements, wiring diagrams, ampere ratings, operating data and electrical characteristics of nine standard limit switches. *R. B. Denison Mfg. Co.*

For free copy circle No. 8 on postcard, p. 137

Motor controls

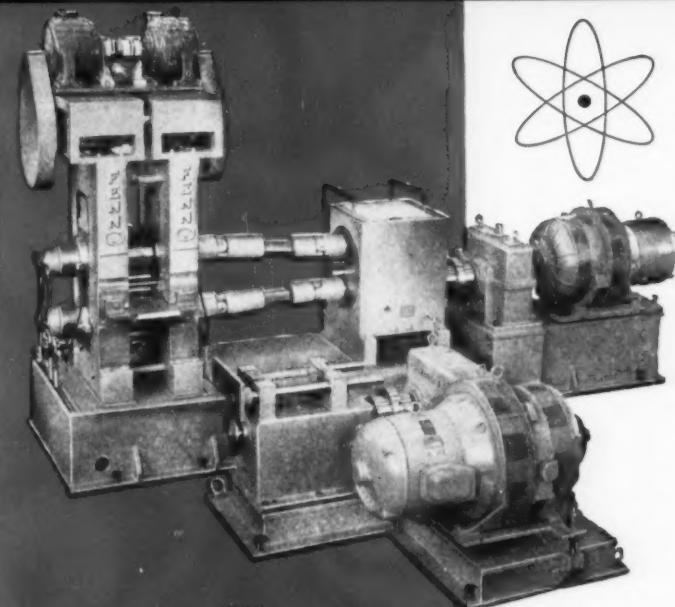
High-voltage starters are reviewed in a 2-page sheet. It describes a motor control without power fuses for high-voltage systems up to 50,000 kva. The printed matter discusses outstanding features of the new starter and explains its applications. It also provides dimensional diagrams. *General Electric Industry Control Dept.*

For free copy circle No. 9 on postcard, p. 137

THE MARTIN COMPANY
chooses

Fenn 4-083 Rolling Mill

for Nuclear Division



Fenn's new large combination type laboratory Rolling Mill, first shown at the Metal Show, has already been acclaimed as the finest of its size. A typical installation is in the Nuclear Division of The Martin Company at Baltimore. It is one of several important pieces of Fenn Nuclear Machinery being installed in the manufacturing division of this new plant.

The Model 4-083 (2½ x 8½ x 8") can be used as either a two-high or four-high mill, driving either back-up rolls or work rolls. It is capable of taking heavy reductions (up to .080" per pass) on ferrous strip at all speeds between 100 fpm and 500 fpm. Many drive combinations can be used to meet your specifications.

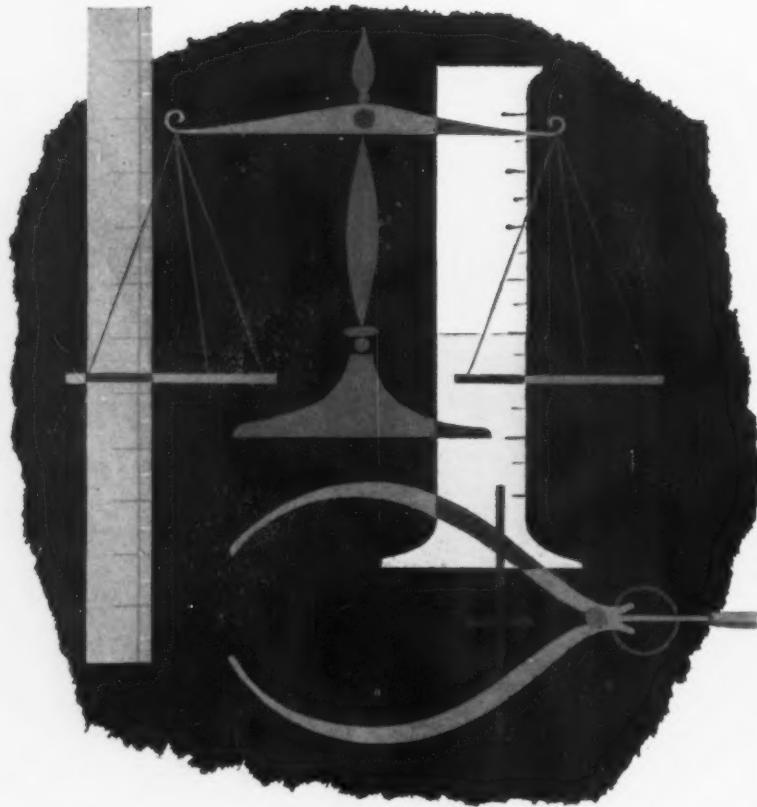
For complete information write for Fenn Rolling Mill catalog No. FRM-56 and list of present users of Fenn Metal Forming Equipment in the nucleonic industry.



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BE SURE TO VISIT THE FENN BOOTH NO. 236
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distributors of foundry supplies from coast to coast

Air tools

In its second edition, an 84-page catalog contains descriptions and specifications of industrial air tools. It describes some 40 basic tools, with thousands of model variations, accessories and adapters. Featured are new air screwdrivers and nut-setters, vertical grinders, die grinders, and series straight grinders. The catalog also stresses interchangeability of parts for many tools. *Thor Power Tool Co.*

For free copy circle No. 10 on postcard, p. 137

Automatic chucker

Engineered for fast, automatic machining of large, complex workpieces in one operation, a new single spindle chucking automatic is presented in an illustrated bulletin. Said to open up a whole new field of profitable turning jobs in both short and long production runs, the big machine sets up quickly like a turret lathe. It uses standard turret lathe tooling, and changes speeds and feeds automatically under cut. A 40-hp drive motor powers it. *Warner & Swasey Co.*

For free copy circle No. 11 on postcard, p. 137

Oil-tight pushbuttons

Two new oil-tight pushbuttons are announced in a booklet now obtainable. It explains how a unit combines the functions of a single button station with the advantages of a two or three position selector switch. Contacts are maintained or momentarily operated by either turning the guard ring, depressing the button, or a combination of both. An indicating light provides a simple means of checking indicating lights without disturbing the control circuit and without removing a lens or bulb. This entire line of oil-tight pushbuttons offers a "back-of-panel" depth of only 1-23/32 in. for the transformer types and 1 1/8 in. for the resistor units. They are available in key-operated, selector switch, flush button, mushroom head or knob-operated models; each utilizes a durable, neoprene-diaphragm seal for complete oil-tightness. *Cutler-Hammer, Inc.*

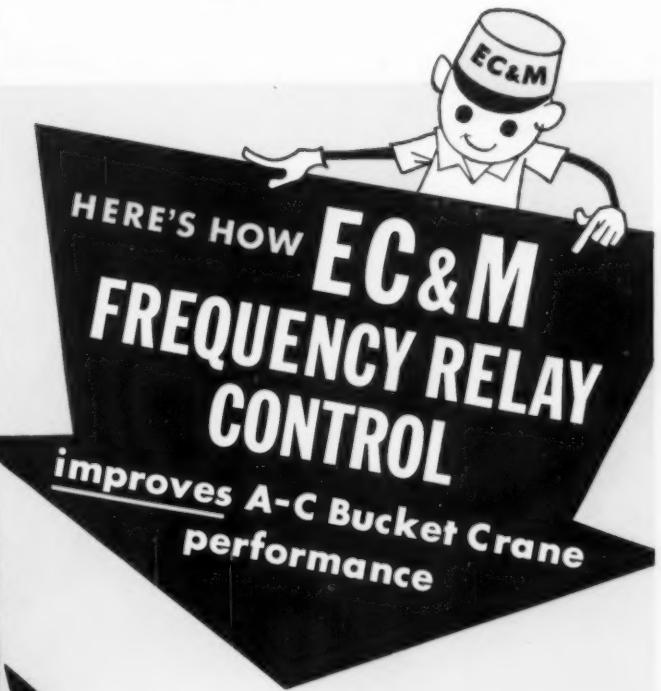
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Bucket crane of the Level-Luffing type operates speedily under EC&M Contra-Torque Hoist Control



Bucket cranes in this fertilizer plant operate at high output with EC&M Contra-Torque Hoist Control



CONTRA-TORQUE®

FAST GETAWAY! Quickly responsive to the frequency of the induced-rotor voltage, EC&M FREQUENCY RELAYS match torque requirements to the load. They get the motor up to speed quickly for lowering the bucket and moving the trolley in or out. A lot of time saved between trips!

WIDE SPEED SELECTION! These relays permit pick-up of Contra-Torque lowering connections on any master switch speed point. No waiting until last down point is reached. Wider choice of speed gives greater flexibility in clean-up operations and speeds output!

SMOOTH STOPPING! When checking motor-lowering speed, weak torques are provided for light loads or the empty bucket; stronger torques for heavier loads. Trolley motor is stopped and reversed smoothly under frequency relay automatic operation!

SPEED-LIMITING! Safety on all speeds. These relays (one set for hoisting and lowering) automatically shift motor connections to safeguard lowering operation with far greater skill than human hands.



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A DIVISION OF THE SQUARE D COMPANY
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When your product is in the production planning stage, think of Copperweld. As a leader in electric furnace steels, Copperweld offers a complete line of hot-rolled blooms, bars and billets of carbon alloy steels, either leaded or unleaded.

For example, selection of a Copperweld leaded alloy may cut your production time 50% and, because of its faster feeds and speeds, can cut tool costs as much as $\frac{1}{4}$.

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STEELS

COPPERWELD STEEL COMPANY • Steel Division • Warren, Ohio
EXPORT: Copperweld Steel International Co., 225 Broadway, New York 7, N. Y.

FREE TECHNICAL LITERATURE

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

This section starts on p. 132.

Cradle-straightener

Rated at 4000-lb maximum capacity, a combination coil cradle-straightener is described in written matter now available. The unit takes coils up to 60 in. diam and 18 in. wide. Maximum stock thickness it handles is 0.045 in. The combination automatically supplies a controlled slack loop of straight, flat stock from which any machine can draw. Feeding devices thus do not need to pull against the weight of a heavy coil. This results in speed and accuracy. *Benchmaster Mfg. Co.*

For free copy circle No. 13 on postcard

Roller bearings

Engineering and technical data on multi-row cylindrical roller bearings appears in a new 24-page catalog. These bearings are for heavy-duty service in roll neck mountings on all types of hot and cold rolling mills. *SKF Industries, Inc.*

For free copy circle No. 14 on postcard

Frequency control

A new bulletin describes all-electronic load and frequency control systems for captive plant, small utilities, and multiple station systems. Although each control system is custom-planned, the bulletin describes the individual servos that form an interlocking, continuous chain for the cumulative control of all factors, from ties to generators. Included are electrical servo-mechanisms for area requirement computer, control circuit, positive governor adjustments, incremental loader, high-speed telemetering, and alarms. *Industrial Div., Minneapolis-Honeywell Regulator Co.*

For free copy circle No. 15 on postcard

Refractories

Containing 48 pages, a new handbook tells how to get the best service from refractory brick and ramming mixes in electric furnaces. It is literally packed with helpful data and suggestions. These cover: installation methods, furnace lining repairs, heat-up, rebuilding and more. Truly well-illustrated, it covers recommended installation methods for one company's basic brick and ramming mixes. The booklet is educational, interesting and, most of all, useful. *Kaiser Chemicals Div., Kaiser Aluminum & Chemical Sales, Inc.*

For free copy circle No. 16 on postcard

Furnace brazing

Filled with helpful information, a new data folder explains many processes available from a major furnace brazing company. It explains their particular features and suggests reasons for using a specific method. Other data includes materials to use, size limitations of parts, design, finish, etc. It shows photographs of various equipment used in brazing. The literature also lists available equipment. *Fabri-form Metal Products Div., George Getz Corp.*

For free copy circle No. 17 on postcard

Chisel shank

Operating advantages and features of a pneumatic chisel shank of new design are described in a folder now available. Big advantage is in safety as breakage is virtually eliminated. Increased efficiency and ease of operation are also cited for the units. *Delaware Tool Steel Corp.*

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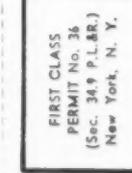
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FREE TECHNICAL LITERATURE

Blast cleaning

Automation in cleaning rooms of soil pipe foundries is discussed in a new publication. It deals with the airless abrasive blast cleaning process. Several plant case histories appear, showing how not only pipe but fittings also are cleaned automatically in both standard and specially-designed airless abrasive blast cleaning machines. Performance data is given along with the photographs of the equipment. *Wheelabrator Corp.*

For free copy circle No. 19 on postcard

Radiation monitors

Remote area radiation monitoring systems are introduced in a new four-page bulletin. It illustrates the basic control unit, plug-in station units, and sensing elements. The literature covers information on uses and contains specification data. *The Victoreen Instrument Co.*

For free copy circle No. 23 on postcard

Palletless handling

A new bulletin introduces a "push-pull" loader with an integral side-shift for palletless materials handling. In addition to listing specifications, it explains how the attachment can be fitted to any of the company's industrial lift trucks. It pictorially describes the proper procedure for handling without pallets. *Yale & Towne Mfg. Co.*

For free copy circle No. 24 on postcard

Sheet metal tools

Just published, an illustrated 32-page booklet briefly catalogs manually operated machines and tools for light sheet metal work. Pocket-size, this handy guide contains summarized data and descriptions of many models. For complete information on any particular item, references are made to other company bulletins. *Niagara Machine & Tool Works.*

For free copy circle No. 20 on postcard

Steel cylinders

Lightweight high and low pressure steel cylinders are pictured and described in a brochure just released. The eight-page booklet gives specifications of 55 standard containers; these range in capacities of from 8.6 to 855 cu in. and service pressures of from 300 to 3000 psi. It outlines methods of cylinder production, inspection and hydrostatic testing. *Walter Kidde & Co., Inc.*

For free copy circle No. 21 on postcard

Electrical-mechanical kits

Tables of common gear ratios and moments of inertia for gears are included in new instruction sheet for one manufacturer's electro-mechanical assembly kits. With these, appropriate components are quickly and easily assembled to test, correct and finally prove the design of a control system, computer sub-assembly, motor drive gear train, or any other set-up requiring a combination of electrical and mechanical components. The new instruction sheet spells out instructions for installing components in hangers, installing hangers, gears, gear alignment and gear selection. *Servo Corp. of America.*

For free copy circle No. 25 on postcard

Nuclear research

Comparisons of wear rate, sliding behavior and coefficient of friction of different bearing materials are compared in an 8-page research paper recently made available. The report covers a two year study by a Canadian research group under which more than 100 combinations of bearing materials were evaluated. Tables summarize results of the tests under various speed, load and lubrication conditions. The testing machine and test procedures are described. *The Electropolizing Corp.*

For free copy circle No. 26 on postcard

Turbo-compressors

Turbo compressors for oil and gas fired equipment, foundry cupolas and other applications are well-illustrated and clearly described in a dozen-page bulletin. They supply high volume and low pressure air. These are centrifugal type compressors that increase air pressure in stages using lightweight impellers. In some industries, they are known as "blowers." It describes equipment for volumes from 85 to 20,000-cfm; pressures from 4-oz to 5-lb. *The Spencer Turbine Co.*

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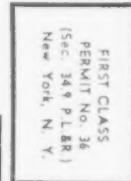
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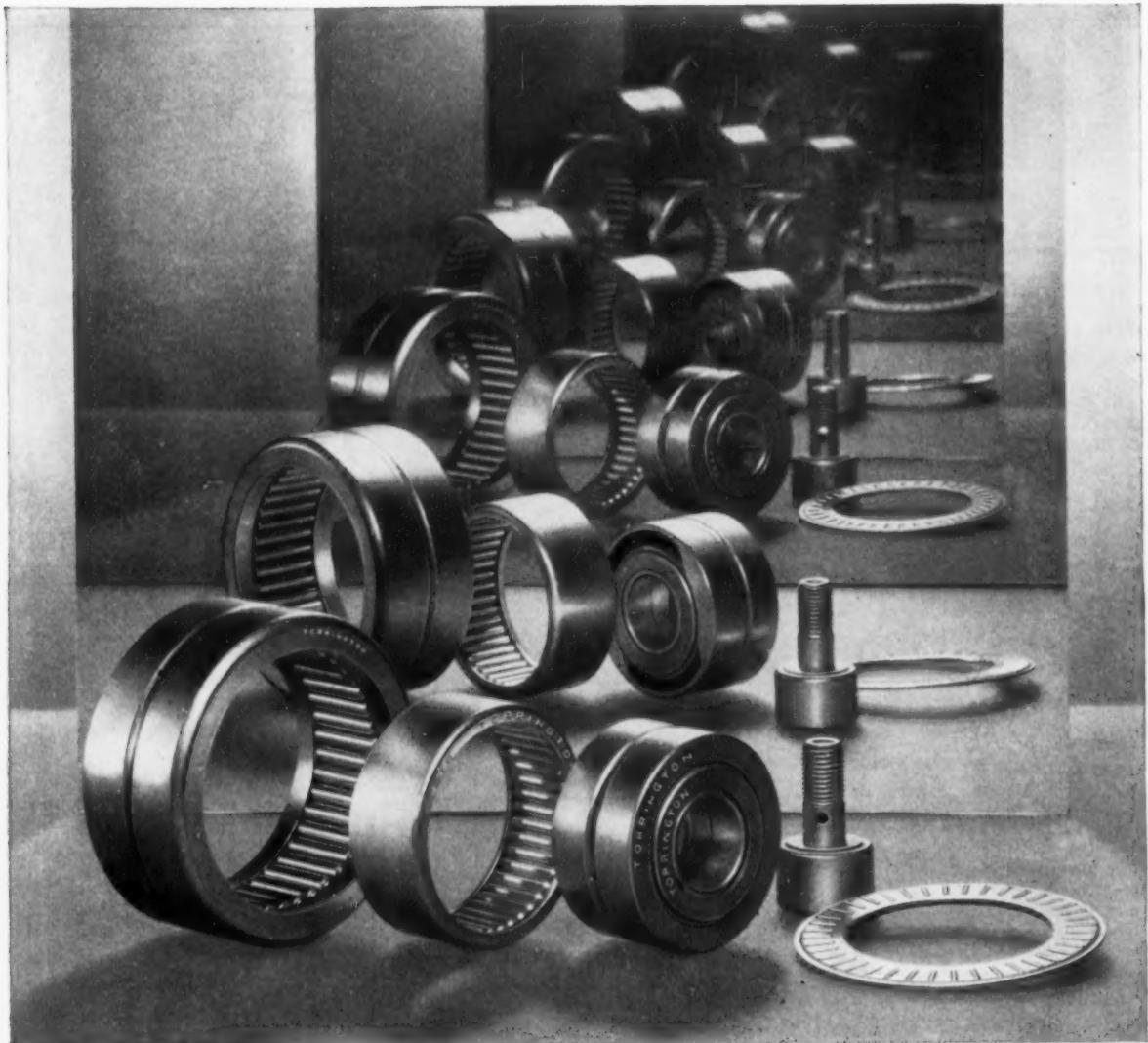
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...look to Torrington, pioneer in the development of every type of precision Needle Bearings.

Using carefully selected quality steels, and the most modern manufacturing methods, Torrington has developed a complete range of types and sizes of Needle Bearings for every use. There are special designs for rotation, for oscillation, even thrust applications! There are aircraft types, cam followers, and heavy duty types. Yet their unit cost is low, bringing anti-friction performance with economy.

Precision manufacture and the full complement

of rollers that provides maximum radial capacity in minimum cross section make Torrington Needle Bearings top performers in the most rugged applications.

Little wonder their use has spread to countless applications in every field with outstanding success. Have you considered them for your product? Send for further information today.

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February 14, 1957

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the original alloy steel chain

FOR THE FIRST TIME

Assemblies are now available with a choice of coupling links:

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coupling links
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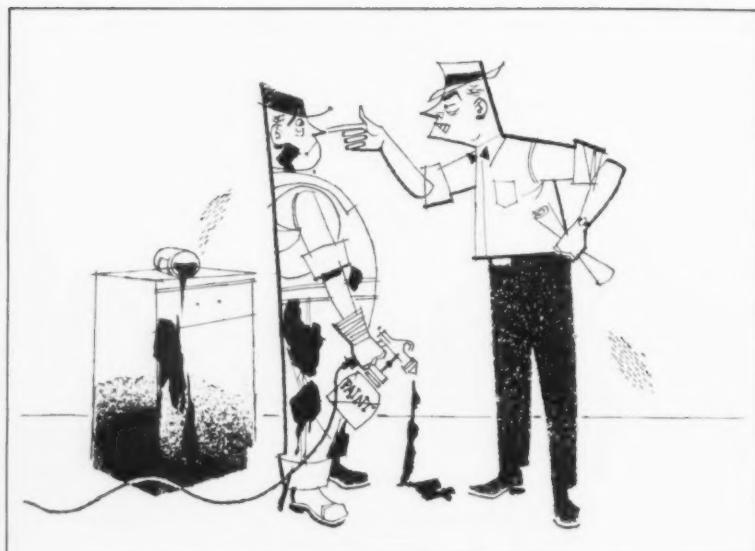
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You Arbitrate It!

THE SLOPPY SPRAY PAINTER

From the files of the American Arbitration Association.

The foreman and the union shop steward of a kitchen furniture factory were getting on badly, each accusing the other of interference, discrimination and general nastiness. Things came to a sudden boil when a spray painter was accused by the foreman of sloppy work. The painter, an experienced workman and a member of the union's executive board, got excited and it took several hours to calm him down.

President Backs Foreman

"That does it," said the steward. "The foreman has gone too far. He picked a fight with us once too often. This time we're going to get rid of him." He assembled the grievance committee, marched into the company president's office, and demanded that the foreman be discharged. The president, of course, backed up the foreman. He not only denied the reasonableness of the union's complaints, but said that since the foreman was on management's team and outside the bargaining unit, the union had

no right to demand his dismissal.

Eventually, the case went to arbitration, where the parties submitted two questions: (1) Is the union demand that the foreman be fired arbitrable? and (2) If so, should the foreman be fired? In reply to the company's claim that the hiring or firing of management personnel was outside the area of collective bargaining, the union answered that a foreman who disturbed good employee relations and made experienced workers nervous by incessant nagging constituted a "health hazard." As such, the union concluded, retention or dismissal of such a foreman was arbitrable. How would YOU rule?

The Arbitrator Said:

Although a demand for dismissal of a foreman is not arbitrable unless specifically made so in the agreement, such a demand could be considered arbitrable if the foreman's conduct was so extreme as to make for unsafe working conditions. The facts of this case, the arbitrator ruled, did not warrant such a conclusion. Without further discussion, he said the union's grievance was not arbitrable.

Caution: The award in this case is not an indication of how other arbitrators might rule in other apparently similar cases. Arbitrators do not follow precedents. Each case is decided on the basis of the particular history, contract, testimony and other facts involved.

New Books:

"Design of Gray Iron Castings" presents casting from the designing engineer's viewpoint. It covers functional strength, performance, appearance and economy. Cooperatively authored by Arthur Scharf, M. E. Div., Battelle Memorial Institute, and Charles F. Walton, it brings together recent design data. 46 pp. \$3.00 per copy. Gray Iron Founders' Society, National City-East 6th Bldg., Cleveland 14, Ohio.

"Organizing for Effective Systems Planning and Control" is based on case histories by executives of Lockheed Aircraft Corp. and Cleveland Electric Illuminating Co. They explain the operation of their systems departments and over-all approaches to planning and control. These have resulted in integrated operations on all levels and improved managerial performance, the book explains. 192 pp. \$4.50 per copy (\$3.50 for members). American Management Assn., 1515 Broadway, New York 36.

"Engineering and Design Manual" of investment casting presents the advantages and limitations of this process. Rules governing design cover dimensional tolerances and shapes. Ferrous and non-ferrous alloys recommended for the process are included. 64 pp. \$5.00 per copy. Investment Casting Institute, 27 E. Monroe St., Chicago 3, Ill.

"Establishing an Integrated Data Processing System" offers a possible blueprint for a company program, with or without installation of costly electronic systems. In non-technical language, it clearly details the network, from preliminary steps to installation. Future operations are also discussed. 183 pp. \$4.50 per copy (\$3.50 for members). American Management Assn., 1515 Broadway, New York 36.

"The Fatigue of Metals" covers fundamental considerations on metal fatigue. 148 pp. 16 two-page tables. The Institution of Metallurgists, 4 Grosvenor Gardens, London, S.W. 1, England.



Solving problems with VULCAN Tool Steels:

Production run tripled

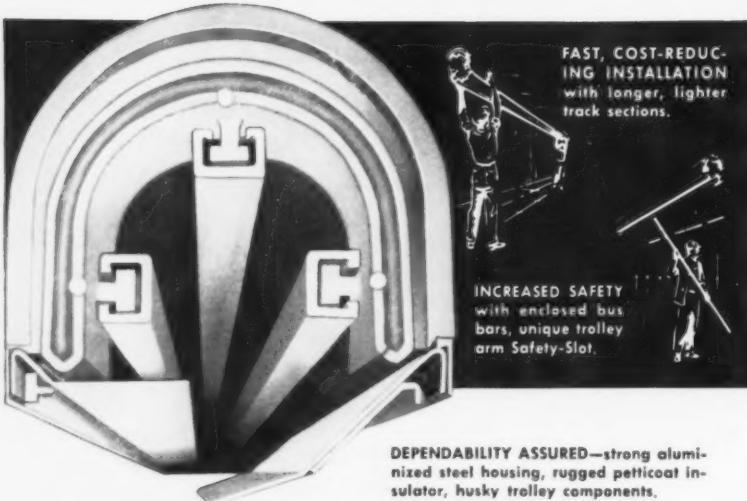
Until recently, a run of 200,000 switch boxes on a double-acting draw press was an accepted standard at Steel City Electric Company, Pittsburgh. The compound die used in this single-stroke blanking and drawing application is subjected to severe abrasion. The boxes come off the press hot.

Under pressure for greater production, Vulcan Alidie tool steel was used for the complete tooling set-up. 688,000 boxes were produced in one tool run. Inspection proved that the run could have gone even longer. Is there room for this kind of improvement in your production schedule? Talk to your Vulcan representative—your specialist in forged tool steels. *Vulcan Crucible Steel Division, H. K. Porter Company, Inc. Aliquippa, Pa.* Offices and warehouses in principal cities.



Jesse Casasanta, tool and die supervisor, Steel City Electric Company, calls the performance of Vulcan Alidie Tool Steel in this test "a near miracle."

H.K.P.  **VULCAN CRUCIBLE STEEL DIVISION**
H. K. PORTER COMPANY, INC.



New **LEC-TROL-FEED** System for fast-action installation . . . safety-first power

This new, preassembled LEC-TROL-FEED conductor system gives you outstanding advantages for supplying electric power to cranes, hoists, welding units and other straight-runway equipment.

LEC-TROL-FEED Systems are installed faster and at lower cost than ever before. All units are preassembled in standard 30 ft. rigid-track sections. That means fewer joints, fewer hangers. Expansion sections are needed only at building joints. No extra rain shields needed for outdoor applications.

You gain maximum safety with LEC-TROL-FEED Systems because current carrying bus bars are almost completely enclosed — minimizing danger from contact with current-carrying bus. Trolley Safety-Slot covers are removable—parts easily accessible.

Additional features include compactness for close vertical stacking, maximum ruggedness, maximum leakage distances, proved aluminum bus bars. Track power capacity 300 amperes, AC or DC; trolley ratings up to 300 amperes.

For complete information, write or ask for LEC-TROL-FEED Bulletin.
Electric Service Works,
Delta-Star Electric Division,
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HKP ELECTRIC SERVICE WORKS
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TECHNICAL BRIEFS

Handling:

Split-personality vehicle
travels on or off rails.

Best described as a vehicle with a split-personality, a hauler switches boxcars on tracks or conveys pigs and ingots in-plant with equal ease. It runs between rails, off rails, over rails and, if necessary, on rails.

At the Aluminum Co. of America's Davenport, Iowa Works, three "trackmobiles" haul, spot and switch freight cars. The machine has two sets of wheels, one for rails and the other for road. It travels on track or ground with no trouble, whatsoever.

Switcher Moves Cars

Prior to 1954, all of the switching, spotting and hauling of railroad cars was done by a railroad switch engine. An arrangement with the railroad provided spotting a string of cars once a day on the track serving a remelt building. This service lacked flexibility because the cars were spotted only once a day. It was inconvenient because the whole string of cars had to be moved to separate empties from loaded ones; this not only required considerable time but also added to the switching charges. More time was lost because scrap

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 137. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

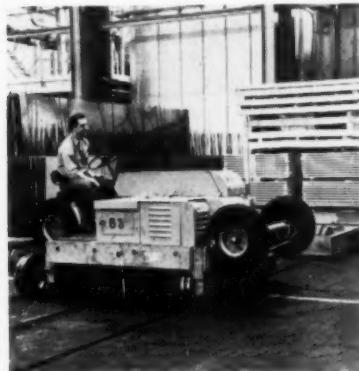
or pig metal had to be moved by fork truck from cars spotted at opposite ends of the building to where it was stored.

About this same time Alcoa also found that the crane and unloading facilities used to handle scrap, pigs and ingots for remelting were inadequate because of the rapidly increasing quantities of these ma-

terials. This, and the switching worries started Alcoa seeking a solution to cut costs and eliminate the inconvenience and wasted time.

After investigating they settled on a "Trackmobile," a cross between a midget locomotive and a highway cab. This speeded up the movement of cars on a short spur track that was built into the remelt building to allow the unloading of one car at a time in the area. This vehicle also spotted cars in the box shop, storeroom and occasionally for shipping when requested.

In early 1956, to gain more storage space for scrap and pig, the



The dual-identity unit moves a load of sheet for annealing.

center portion of the railroad well was filled. This eliminated the through track and resulted in short tracks at each end of the remelt building. This change presented no problem for the hauling unit because of its ability to travel on track or ground. It continued moving cars as rapidly as before.

Later, Alcoa purchased a heavy-duty unit of the same design to handle incoming cars of scrap, pigs and ingots. Eventually, the total number of cars to be moved every day for remelt will approximate 50-pet more than at the end of 1955 (before the first "Trackmobile" was purchased).

Moves In and Out

At the present time the railroad switch engine spots cars at various locations on the track outside the remelt building. The combination vehicles then moves into and out of the building as they are needed. The large model also moves cars for the shipping department. The orig-



Here's the perfect answer to your questions on non-ferrous alloys. The well illustrated Riverside products handbook contains a complete listing of the composition and physical properties of the top-quality phosphor bronze, nickel silver and other non-ferrous alloys Riverside makes.

If you use or fabricate metal parts, you'll want to keep this informative book on hand for ready consultation.

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Please send me my free copy of your new handbook, "Riverside Alloys"

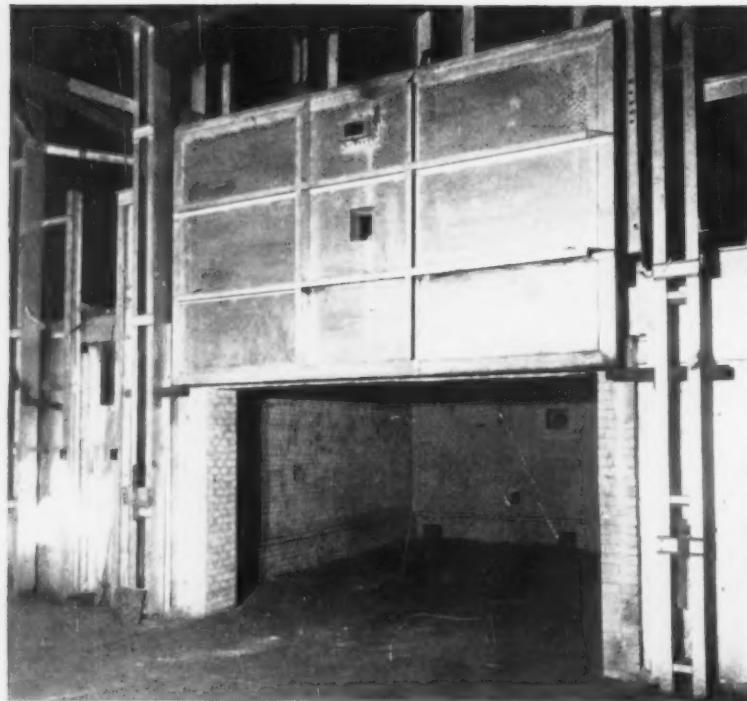
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HKP **RIVERSIDE METAL DIVISION**
H. K. PORTER COMPANY, INC.



Annealing time, fuel costs cut with Laclede refractory "package"

Look at these results from the installation of Laclede refractories in a Terre Haute Malleable and Manufacturing Corporation annealing furnace. The annealing cycle was reduced from 8 to 6 days. Fuel costs are also down accordingly. More uniform temperatures and headroom—fewer product losses. Easy furnace maintenance, with quick replacement of a few tiles or a worn section.

The Terre Haute installation "package" includes a Laclede tile suspended flat arch, walls and floors of Laclede King brick, and Laclede Castable Refractory for the door lining. This "package" may fit your requirements—or Laclede engineers will develop one to meet your specific needs.

Can you use time and cost-saving benefits? Call your Laclede-Christy man or write *Laclede-Christy Division, H. K. Porter Company, Inc., St. Louis 10, Missouri.*

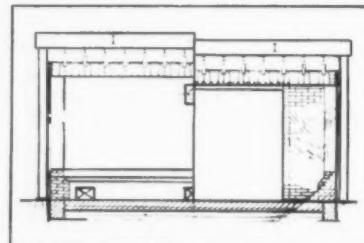


Diagram shows Laclede furnace construction at Terre Haute using three types of Laclede Refractories to meet job requirements.

HKP → **LACLEDE-CHRISTY DIVISION**
H. K. PORTER COMPANY, INC.

TECHNICAL BRIEFS

inal model now does miscellaneous spotting jobs for the box shop, storeroom, tank cars, shipping and emergency service.

A third "trackmobile" has been purchased by the aluminum firm for pulling annealing furnace cars. This is specially designed with: 16-in. diam track wheels (standard models have 18-in. AAR contour cast steel wheels); a 6-ft 2 15/16-in. track gauge (standard is 4-ft, 8 1/2-in.); a drive pinion (standard is a drive gearcase to driving axle



Moving freightcars is easy for the pavement-track traveler.

and by side rods to driven axle); and a hydraulically operated tow bar (standard is any hydraulically operated coupler for transferring part of the freight car's weight onto the hauler to gain additional traction).

These design changes were made because of special needs in hauling annealing furnace cars. The 16-in. wheels meet height requirements of furnaces and furnace cars. The wide track gauge was necessary because it was previously used for an old type motor driven car puller. The method of propulsion was changed to allow the drive pinion to transmit motive power through a gear rack embedded in the floor midway between the tracks to provide non-slip traction.

Tow Bar Is Special

Maximum draw-bar pull is 13,000 lb; this is capable of moving a total load of 300,000-lb. The hydraulically operated tow bar was designed to engage a special hook on the furnace cars.

Nonferrous:

Heat treat won't distort new magnesium alloy sheet.

The availability of a new magnesium alloy may allow aircraft and missiles to go faster and farther. In cooperation with the Air Force, the alloy was developed by Dow Chemical Co., Midland, Mich. An intense evaluation is currently underway concerning it.

Material Resists Heat

Strength of the new alloy at temperatures of 600 to 700°F is reportedly superior to the best elevated temperature aluminum or magnesium alloy available today. One-hundred hours exposure of the alloy at temperatures up to 700°F causes virtually no change in its tensile strength, yield strength and elongation properties when tested at these temperatures.

It is claimed to be the first magnesium-thorium alloy which can be heat treated as sheet without suffering severe sheet distortion. In addition, it is 30-pct lighter than aluminum alloys. Thus, valuable weight savings in airframe construction could be realized. The improved properties of HM 21 over the current magnesium high temperature alloy (HK 31) are obtained by decreasing the thorium content from 3 to 2 pct and using manganese in place of the more expensive zirconium.

The new alloy is now in limited production, following three years of development. Its use in airframes, skins, and other structural components is anticipated.

Research:

Crystal gazing produces better, uniform steel.

Crystal-gazing helps produce better, more uniform, higher quality steels. This is being done at the new U. S. Steel Research Center in Monroeville, Pa., by the harnessing of electrons.

This gives a new look into the tiny crystals found in steels. It requires the use of electron optical

Improving wire rope service with

LESCHEN

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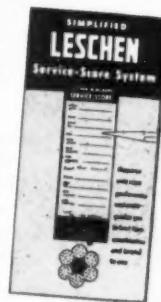


How to prove wire rope performance for yourself

There is a difference in wire rope—in types, in constructions, in brands. And using the right rope every time can easily reduce rope costs by 10% to 20% or more.

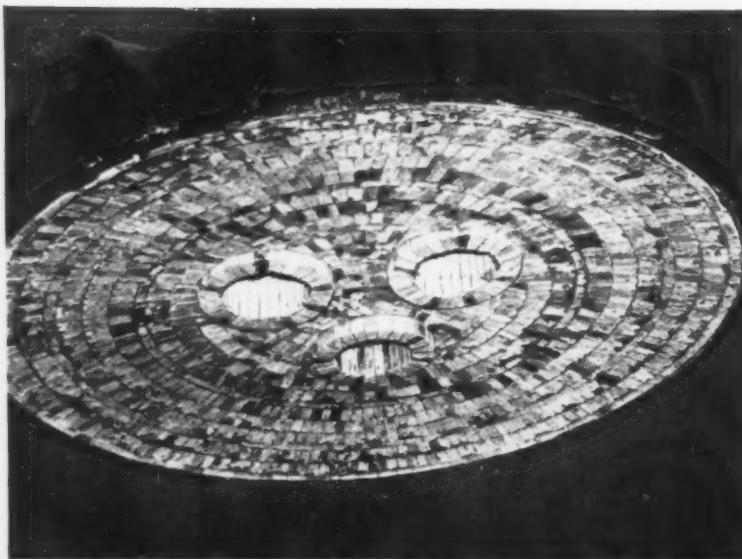
How do you know which rope is right? First, get good advice. Leschen field men, distributors and Leschen's engineering department can help you make the best choice. Second, prove it out with easy-to-use Leschen Service-Score stickers. They tell you right on the job how you're doing—help you make accurate comparisons.

Keep the score—see the results—and you'll use more Red-Strand Wire Rope. See your Leschen man or write Leschen Wire Rope Division, H. K. Porter Company, Inc., St. Louis 12, Missouri.



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H. K. PORTER COMPANY, INC.

TECHNICAL BRIEFS

systems far in advance of ordinary laboratory procedure.

To learn the composition of crystals which cannot be removed from the metal, the investigators have used an instrument which is a modification of the electron microscope. It is called the X-ray point probe microanalyzer.

This is the first place in the United States where the novel instrument has been put into use.

Probes Minute Area

The microanalyzer probes a minute area about 0.00025-in. in cross section. This is done by focusing a beam of electrons on the tiny zone. Even variations in the steel on the edge of a razor blade show up, using this method.

When the focused beam of electrons bombard part of a steel particle, they cause it to emit X-rays. These rays bear the characteristics of elements in the particle. Thus they serve to identify the components of the steel, just as fingerprints identify people.

An X-ray detector picks up and records on a chart the radiations from the particle of steel. The pattern recorded by the rays is



Researcher studies variations on
razor blade's edge.

compared with charts of pure elements. These charts are kept on file somewhat as fingerprints are. By comparisons the investigator determines the make-up of the sample.

With this information, the metal-

lurgist brings out the best qualities in steel. He does this by prescribing more exact heat treating and processing on the basis of the data revealed by the new research tool.

With the X-ray point probe microanalyzer it is possible to determine the chemical composition of particles too small to be analyzed by any other method. It shows how the formation of non-metallic particles may locally change the amount of alloying elements present in a stainless steel and so make the metal susceptible to corrosion.

The basic instrument, which has been modified, is a vertical 7½-ft electron microscope with a 4-foot electron column.

Machining:

Huge 150-ton miller works complex forms.

A huge 150-ton airfoil milling machine sculptures in metal the complex shape of an airplane's wing or the twisted blades of an axial flow air compressor.

Now in use by NACA's laboratory at Moffett Field, Calif., the unique machine tool was built by Danly Machine Specialties, Inc., Chicago.

The products of the Danly machine and its smaller forerunners have been used as models in tests in supersonic wind tunnels; some have been essential parts of the driving machinery of the wind tunnels themselves.

Machines Trace Surfaces

The machine has milled a series of blades now installed in the main drive compressors of several large wind tunnels at the laboratory.

Airfoil millers, of which the new machine is an advanced example, are essentially machines for duplicating in metal a complex curved shape generated by tracing a prepared pattern. A wooden pattern mounts vertically on a circular revolving table. Two large tracer

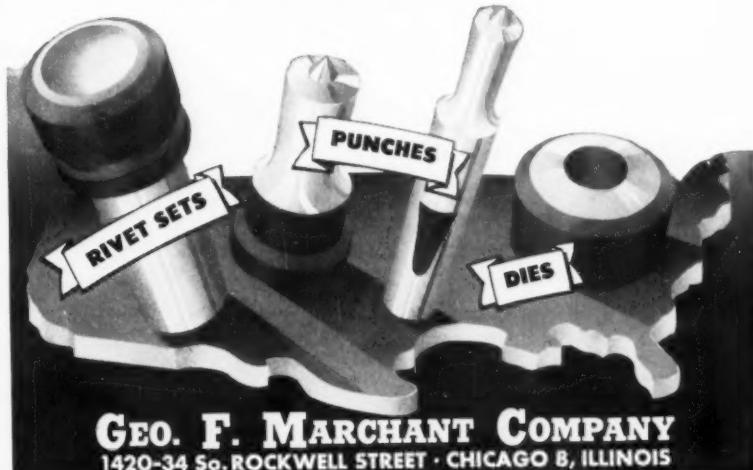
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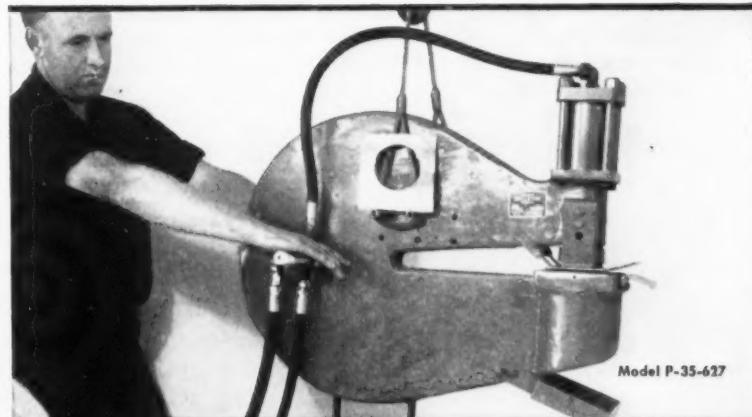
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sion balancer or roller mounted to move along track adjacent to cold reduction mill. Other models also available.

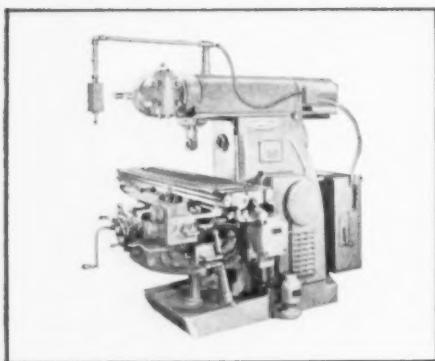
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Horizontal Milling . . . Four-bladed face mill performs four horizontal milling operations on magnesium casting. Simple fixture on rotary table holds workpiece. Four milling positions accomplished through indexing of rotary table.

Vertical Milling . . . using a carbide two-lip end mill in the ram head spindle, three vertical milling operations are completed without disturbing the setup. Rotary table is used for indexing the workpiece.

Multiple setups and excessive handling eliminated



10hp No. 3 Model CH, Plain style Ram Head milling machine with Mono-Lever and Automatic Cycle Table Control and Type U Universal Head.

Kearney & Trecker Ram Head Milling Machine completes seven operations without removing workpiece

Kearney & Trecker's new line of Ram Head milling machines combines a conventional horizontal spindle and a self-contained motorized sliding ram. As a result, horizontal and vertical spindles can be run separately and simultaneously.

The Ram Head machines are available with a choice of three heads—Universal, Vertical and Quill types which can be rotated through 360°. You can perform vertical, horizontal and angular milling on one machine *in a single setup*. They are built in No's. 2, 3, and 4 sizes in both plain and universal styles. Plain machines may be optionally equipped with Mono-Lever and Automatic Cycle Table Control.

For the full story, contact your nearest Kearney & Trecker representative, or write Kearney & Trecker Corp., 6792 W. National Ave., Milwaukee 14, Wis.



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wheels are held in contact with the pattern. As the table revolves, the relative motion of the tracer wheels is transmitted to two cutters. The cutters are positioned against the metal blank to be machined; the blank also revolves at the same speed as the pattern. In this way the cutters shape the metal blank to the same curve as the wooden pattern.

spindle motors of 75 hp each drive the metal-cutting tools which shape the work blank. Other motors turn the table on which the pattern is mounted, provide lubrication, pressurize the complex hydraulic system of the machine and furnish cooling where necessary. It has a total of 424-hp. Nearly 80,000 ft of wiring has been used in the machine and its electrical control panel.

A wide range of flexibility has been built into the machine so that it can work in various materials. For cutting alloy steels a speed range of 78 to 785-sfpm is available; for aluminum alloys speeds between 314 and 3140 sfpm are available. The Danly machine is capable of working to an accuracy of ± 0.004 -in. over a 24-in. chordal length and maintaining a good quality of finish.

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**Cutters mill an airfoil shape,
one-fourth the pattern size.**

The miller's action is fully automatic once the pattern and workpiece have been put in place. It is capable of machining a shape 18 x 18 x 96 in. long or 8 x 26 x 96 in. long. The mechanism for holding the metal blank to be machined can exert an upward thrust of 8500-lb. Both pattern and workpiece on the machine are mounted vertically, in contrast to previous airfoil mills of horizontal design. This mounting method eliminates any bending that might result from the weight of the metal blank being shaped.

Much of the giant machine is hidden from sight in a pit beneath floor level. The sub-floor area is 25 x 25 x 15 ft high and contains a smaller pit 8 ft deep and 6 ft in diameter. The latter pit accommodates a mechanism for the turntable on which the workpiece rides. The machine rises 17 ft above the floor of the laboratory machine shop; it occupies a 600 sq ft area.

Seventeen electric motors operate the new airfoil machine. Two

Metallurgy:

Interface between coat
and base metal is vital.

Whenever metal coatings are being considered as protection for an underlying, basis metal at high temperatures, particular attention should be paid to the nature of the interface between the coating and its base. This is the thought of Dr. Charles L. Faust, of Battelle Institute, Columbus, Ohio.

Speaking at a symposium sponsored by the Albuquerque, N. M. chapter of the American Society for Metals, Dr. Faust asserted that sound parts composed of a basis metal and protective coating can best be provided when the role of surface metallurgy is taken into account and when the strength and properties of any diffusion alloy formed at the coating-basis interface are known to be satisfactory.

Heat Weakens Metals

Dr. Faust, who directs electrochemical engineering research, points out that many metals, for example molybdenum, have suitable bulk properties—tensile and creep strength, hardness, etc. Yet they undergo surface deterioration at the temperatures reached in aero-dynamic heating. (Aircraft skin



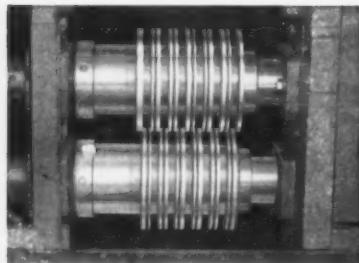
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temperatures may reach 600°F at speeds of 2000 mph and possibly 1600°F at 3300 mph.)

The interfacial zone between the basis metal and its protective coating can be responsible for the success or failure of the composite item. Of major importance to adherence of the coating are bond strength between the coating and the basis metal, and the preparation of the basis metal. Preparation includes final physical and chemical cleaning and, also, the last surface finishing operations. For instance, the damaged and weakened surface caused by lathe-turning of 100,000-psi steel is the Achilles heel of a composite of this steel. A coating with a 90,000-psi strength, because the weakened surface of the steel has a tensile strength of only 35,000 psi; the bulk of the steel, however, is much stronger.

Coatings Are Inadequate

Instances will occur, says the Battelle technologist, in which a coating and a basis metal as individuals have suitable properties but the diffusion alloy formed at the interface between them does not. In these cases, the interposition of a barrier coating with suitable diffusion characteristics can make the composite object usable.

Chromium and nickel-chromium alloy coatings provide inadequate protection for underlying molybdenum because the "moly" diffuses through the coatings and volatilizes on contact with the oxygen in high temperature air. A chromium-gold-chromium barrier electroplate underneath the final protective coating, notes Dr. Faust, prevents the outward diffusion of the molybdenum.

Handling:

Six jacks lift 300-ton machine with accuracy.

How can a machine weighing 600,000 lb and covering 1200 sq ft of floor space be elevated with perfect accuracy?

That was one of the challenges which confronted engineers at Blaw-Knox Co. when they designed

a 300-ton beam straightener. They found an answer in six 50-ton worm gear jacks connected in series and powered by electric motors. At the touch of a push button, these jacks raise or lower almost 300 tons a distance of $6\frac{1}{2}$ in. to accommodate varying sizes of beams, stanchions and joists.

There are two sets of jacks on either side of the straightener; each set consists of three jacks



Six 50-ton jacks adjust height on the pass line of this unit.

connected in series by shafting and 4-way mitre gear boxes. Each set of the jacks, manufactured by Duff-Norton Co., Pittsburgh, is driven by a $7\frac{1}{2}$ hp motor.

The beam straightener, now installed at U. S. Steel's Homestead, Pa. Works, straightens wide flange beams up to 24 in. wide and light beams, stanchions and joists down to 6 in. Five hundred horsepower drive the huge, 17-ft-high unit. It has nine 36-in. diam rollers and vertical edgers in the front and rear.

The straightener has four top rollers, which can be individually adjusted vertically, and five lower rollers. All are adjustable horizontally.

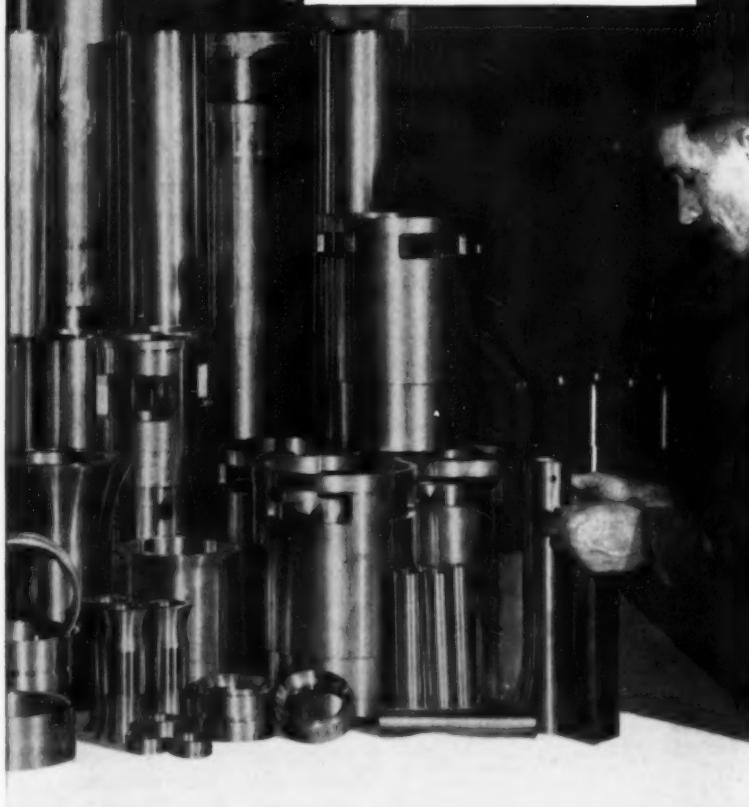
The jacks used on the straightener have a worm gear ratio of 32:1. The screw lift is $3\frac{1}{4}$ in. a minute.

Two jacks are under each end of the straightener with two under the middle. The distance between

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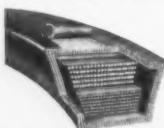
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each end is 15 ft, 4 in. and each set of jacks is 7 ft, 10 in. apart.

It was necessary to make the pass line on the straightener adjustable because the approach tables in the Homestead Works' structural mill are fixed. When a change is made in the size of the beams being rolled, an operator raises or lowers the pass line to accommodate the difference. This takes a matter of seconds or minutes, depending on the amount of raise required.

The worm gear jack system is so efficient that Blaw-Knox engineers elevated the entire unit with only one $7\frac{1}{2}$ hp motor instead of two. No special engineering was required to design the jacks into the beam straightener. They are one of six standard models.

Forming:

Firm cuts forming costs
with 4000-ton press.

Since early 1953, a 4000-ton press has been saving time and money in producing truck and bus side rails at Midland Steel Products Co., Cleveland.

For a great part of these $3\frac{1}{2}$ years, the 4000-ton unit operated three shifts a day, 7 days a week. It does in a single hit a job that once required two forming operations on a 3000-ton press.

Because it does not introduce a camber or bow to the side rails, the horizontal side members of the chassis frame, the huge press eliminates need for intermediate and final straightening operations.

By producing completely formed side rails from flat blanks in a single operation, the unit does away with time consuming die changes, storage of partly formed rails between operations and attendant materials handling problems.

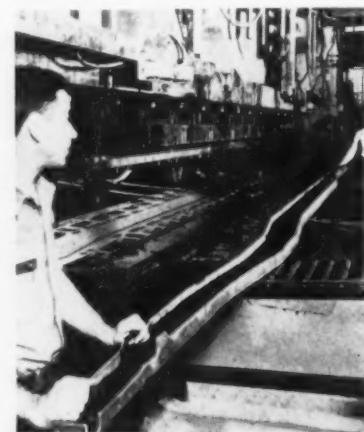
Although the continuous operation has been a heavy burden on the giant press, it has been necessary to keep up a rapid production pace.

The unit also produces special forms such as those for cement mixers and dump trucks.

Low carbon sheet steel side rail blanks up to $26\frac{1}{2}$ ft long x $\frac{3}{8}$ in.

thick are consumed by the press. These flat blanks are turned out on the 3000-ton blanking press and fed into the 4000-ton model.

Before the giant was installed, the procedure entailed three separate operations on the 3000-ton



Workers remove a side-rail after forming from a flat blank.

press: blanking, first form, and second form. Only part of the overall rail length could be formed during one hit on the 3000-ton press. The partly formed rails then had to be stored and fed through the press again to have the remaining length formed by a new set of dies.

Four men make up the minimum crew to operate the press but the number may vary all the way up to eight when the very largest side rails are being formed.

The press was made and supplied by Baldwin-Lima-Hamilton Corp., Hamilton, Ohio.

Materials:

Non-metallic coated wire
solves spring tolerance problem.

A wire with a chemically-prepared, non-metallic coating solved a tolerance problem in making springs for compression spray cans at Lee Spring Co., Brooklyn, N. Y.

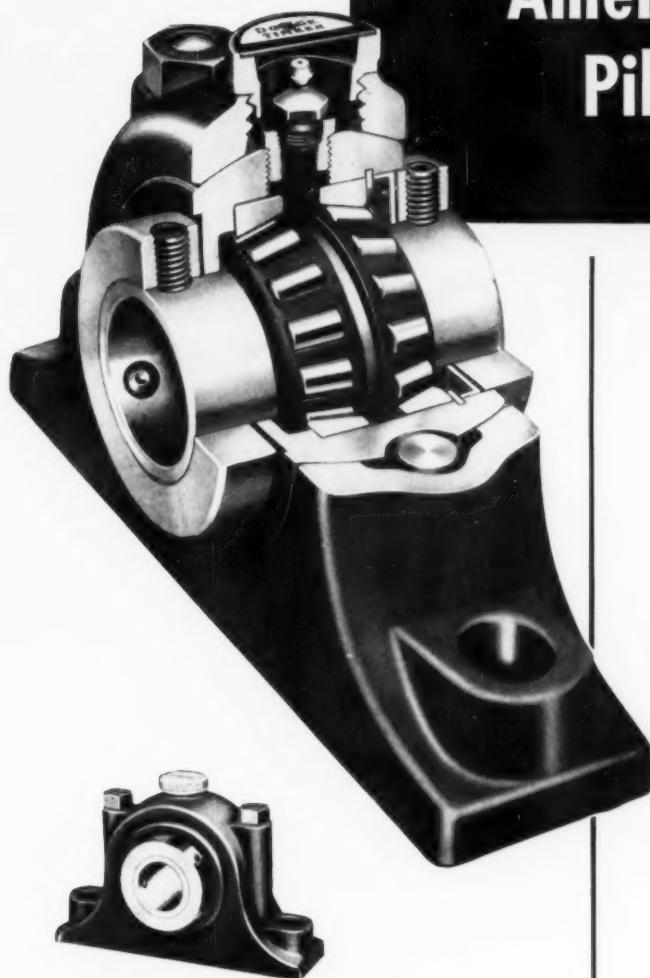
Intolerant With Tolerances

In a free length of only 0.942-in., tolerances of the springs must be held within ± 0.015 -in. If tolerances aren't met, the springs may

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- FACTORY ADJUSTED
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DODGE-TIMKEN Bearings are adjusted, lubricated and sealed at the factory. Labyrinth seals effectively retain the lubricant and prevent the entrance of dust and dirt. The inbuilt precision of Dodge-Timken Bearings is protected both on and off the shaft. They are delivered fully assembled, ready to mount.

Where service conditions are toughest Dodge-Timken Bearings prove their quality decisively. For superior performance, dependability and long life they have won their reputation throughout industry as America's quality pillow blocks.

To meet varying service requirements Dodge-Timken Pillow Blocks are available in five types—the type E . . Double Interlock (illustrated) . . Type C . . Special Duty . . and All-Steel. Available in a range of shaft sizes from 1-3/16" to 10".

Call your Transmissioneer; or write for Bulletin A638 giving load ratings, dimensions and other data on Dodge-Timken Roller Bearings.

DODGE MANUFACTURING CORPORATION
800 Union Street, Mishawaka, Indiana

DODGE
of Mishawaka, Ind.

THE FINISHING TOUCH



by A. B. Hoefer
Vice President
FREDERIC B. STEVENS, INC.

WILL ANODIZED ALUMINUM REPLACE CHROME?

Affirmative answers to this question are revealed in several current business publications and our own sales figures.

Speeding the change is the continued tight supply of nickel. Manufacturers have been forced to look for substitutes and like results anodized aluminum have given them.

A trend is developing. Volume of Stevens anodizing equipment sold in 1955 was nearly double the volume for the two preceding years. At the same time, sales of Stevens compositions used in buffing and polishing aluminum were showing a 50% increase.

THE TREND INDICATES MORE ANODIZED ALUMINUM IN 1957 and 1958!

This Stevens advertisement predicting an increasing use of anodized aluminum, ran over a year ago.

SEE STEVENS FOR AUTOMATIC ANODIZING EQUIPMENT

The increasing demand for more color and more elaborate styling is rocketing the use of anodized aluminum for tumblers, kitchen utensils, refrigerator components, lighting reflectors and many other items.

The 1957 motor cars are using anodized aluminum for medallions, kick plates, grilles, window frames, etc.

To obtain the finest aluminum finishes — at the lowest costs — see your Stevens Representative. Stevens' experience in furnishing complete anodizing equipment assures you of the latest techniques and the best in automatic machines. Let us discuss your requirements with you.

**FOR FURTHER INFORMATION WRITE TO: FREDERIC B. STEVENS,
INC., 1820-18th STREET, DETROIT 16, MICHIGAN.**

**FREDERIC B.
STEVENS**
INCORPORATED
YOUR METAL FINISHING SUPERMARKET
DETROIT 16, MICHIGAN



WAREHOUSES AND OFFICES
IN PRINCIPAL CITIES

jam the assembly machines, interrupting the automated pace. Such interruptions require an operator's attention and reduce the advantages of using the complex and expensive assembly machines.

The company first used a conventional bright music wire for the springs. Music wire met all physical requirements but the rejection rate was excessive, running as high as 10-pct of all lots in strict statistical quality control inspections.

Firm Eliminates Rejections

By using coated wire, the firm virtually eliminated rejections, down to 1-pct. The low out-of-round characteristics and the excellent lubrication provided by the non-metallic coating of this wire make it easy to maintain tolerances during coil winding.

Cost of the wire and production rates are the same for coated wire as for the conventional music wire previously used. The coated wire is produced by National-Standard Co., Niles, Mich.

Alloys:

**New material reduces
size of magnets.**

Substantial improvements in amplifiers, switching and memory devices, pulse transformers, and power transformers are now possible as a result of a new magnetic alloy. This material permits reductions in the size of magnetic components without any sacrifice in performance.

Called "Supermendur," the alloy has a number of exceptional properties, including high permeability and low hysteresis losses at high flux densities. It is a development of Bell Telephone Laboratories, New York City.

Resembles Older Alloy

The composition of Supermendur (nominally 49-pct iron, 49-pct cobalt and 2-pct vanadium) is similar to a magnetic alloy developed at Bell Laboratories many years ago. However, the characteristics of the alloy are improved to a remarkable degree, the developers

report. The hysteresis losses have been reduced by a factor of ten. Maximum permeability is now 66,000 at 20,000 gauss; remanence, 21,500 gauss; coercive force, .26 oersted; and saturation, 24,000 gauss. Core losses are under 6-w per lb at 400 cycles at a flux density of 100,000 lines per square inch. The hysteresis loop is rectangular with a flux swing of 45,500 gauss from minus remanence to plus saturation.

These outstanding properties have been achieved by using commercial materials of the highest purity, melting in a controlled atmosphere furnace, and subject-



Scientist holds tape cold-rolled on mill in background.

ing the resulting alloy to a prescribed schedule of rolling and heat treatment in a magnetic field. The material is so malleable that it can be cold-rolled from 0.090 to 0.0003-in. without intermediate anneals and without losing its ductility.

Provides Greater Output

Power transformer cores of 0.004 or 0.002-in. Supermendur tape provide an output more than 30-pct greater than comparable material. Advantages on an ampere turn excitation basis are even greater percentage-wise. This permits a reduction in core size and weight of at least 30-pct for the same output, a significant factor in many applications. Flux density can ex-

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YOU BUY BEARINGS FROM
YOUR **Bunting**
DISTRIBUTOR**



***more availability**

IN A MATTER OF MINUTES—at any time—wherever you are—you can get a few or thousands of completely finished Stock Bearings and Bars made of Bunting Cast Bronze or Bunting Sintered Powdered Oil-filled Bronze. All over America Bunting distributors carry ample stocks of these highest quality products made in both of the two universally popular metals, backed by Bunting's long experience and established responsibility.

Your Bunting distributor is listed in the classified section of your directory usually under Bars—Bronze, and Bearings—Bronze. Two modern Bunting factories and eleven Bunting Branch Warehouses expedite distribution in all areas. Write, or ask for catalogs giving complete dimensional listings and technical data.

All Bunting Sintered Bronze Bars are machined to size on OD for quick and true chucking; the size is stamped the full length of the bar. Both are exclusive Bunting features.

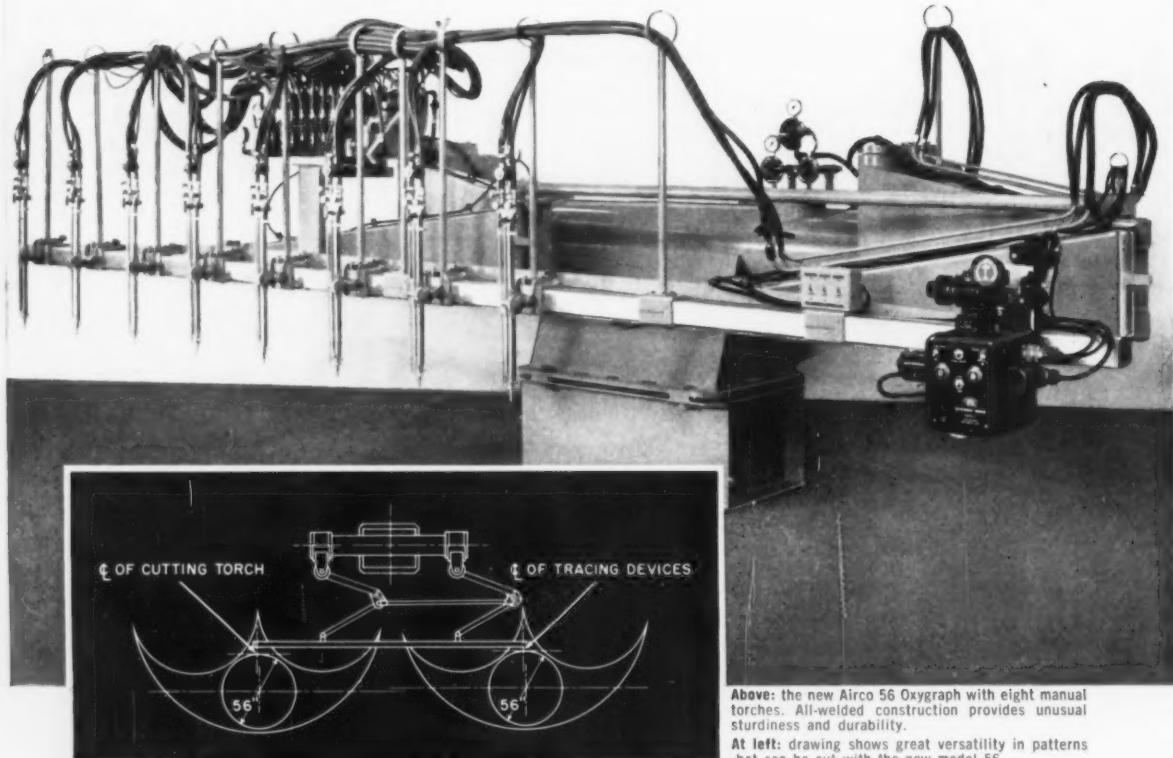


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**BUSHINGS, BEARINGS,
BARS AND SPECIAL PARTS
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POWDERED METAL.**

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...for better machine gas cutting



Above: the new Airco 56 Oxygraph with eight manual torches. All-welded construction provides unusual sturdiness and durability.

At left: drawing shows great versatility in patterns that can be cut with the new model 56.

NEW...Airco 56 Oxygraph

...for better machine gas cutting of larger work on production schedules

This newly developed Airco 56 Oxygraph meets the demand for a multi-torch oxy-acetylene shape cutting machine that will handle substantially large areas. It cuts a full 56" circle, and corresponding square and rectangular shapes. Rugged box girder design is used for the pantograph arms, holding vibration to a minimum. Tracer response is smooth and friction-free as a result of large diameter ball bearings in the pantograph hinges and operating bar assembly.

This newest of Airco Oxygraphs will cut an unlimited variety of shapes from steel plates, slabs, billets and forgings. Flexibility of design allows amplifying scope of machine to meet increased shop demands. Tracers are available in four types: electronic, manual, magnetic and spindle. This widened capacity of the new model 56 marks another step forward in welding and cutting progress. For detailed information on the New 56 Oxygraph, write direct to Airco.

welding
AT THE FRONTIERS OF PROGRESS YOU'LL FIND ...



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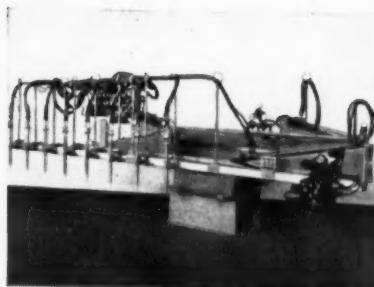


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Products of the divisions of Air Reduction Company, Incorporated, include: AIRCO — industrial gases, welding and cutting equipment, and acetylenic chemicals • PURECO — carbon dioxide, liquid-solid ("DRY-ICE") • OHIO — medical gases and hospital equipment • NATIONAL CARBIDE — pipeline acetylene and calcium carbide • COLTON — polyvinyl acetates, alcohols, and other synthetic resins.



this brand new Model 56 OXYGRAPH

*has these exceptional
advantages*

Cuts a full 56" circle, and corresponding square and rectangular shapes

All-welded steel construction for lasting durability

Box-girder design of pantograph arms assures efficient operation even with maximum loading of operating bar

Reinforced operating bar provides for mounting of torch holders, torches, tracing devices and electrical control equipment

Centralized gas control of torches with electrical solenoid valves allows operator to turn on, light and shut off gases without leaving tracing table

A maximum of 8 torches can be used, with manual or motorized torch holders

A cutting-oxygen ease-on valve, supplied with the machine, is invaluable in making piercing starts



You'll find the new AIRCO 56 Oxygraph a substantial production help in metal shape cutting. For complete details

write direct to

AIRCO

ceed 140,000 lines per square inch without excessive losses.

Western Electric Co., Inc. does not plan to produce Supermendur for commercial consumption. However, a number of companies have expressed an interest in the material and it probably will be manufactured under Western Electric license in the near future.

Testing:

Modern electronics teams-up with old-fashioned screwdriver.

Modern electronics has teamed up with the simple, old-fashioned method of locating machine troubles by screwdriver probe.

Tester Detects Wear

Sperry Products, Inc., has electrified the screwdriver, connected it with a compact electronic amplifier and produced its own bearing tester.

Resembling a portable radio in size and appearance and requiring no more skill to operate, the instrument can be used in any shop for preventive and plant maintenance or quality control.

The bearing tester detects and measures wear in bearings, gears, spindles or slides without disassembly of machinery. On an as-



Metal probe now can substitute for old fashioned screwdriver.

sembly line, it assures precision fitting of mating parts, such as gears. It enables plant maintenance engineers to keep machinery operating at established performance standards. Manufacturers can test any machine under actual operating conditions before ship-

ment. Purchasers can check the proper functioning of every moving part before final acceptance.

Plugs-In Anywhere

The instrument consists of a metal probe, or pick-up, connected by electric cord to a compact electronic amplifier equipped with calibrated meter, loudspeaker, controls and, if desired, with devices for making permanent records.

The electronic testing unit's power supply plugs into any convenient electric outlet.

Finishing:

Automatic plant rapidly finishes diecastings.

Automatic plants are now finishing diecastings at high speeds. A series of highly integrated finishing departments, installed at Precision Castings Co., Syracuse, N. Y., include automated equipment for cleaning, copper-nickel and chrome or brass plating, phosphate coating, electrostatic spray painting, baking and polishing.

Cuts Cleaning Worries

Special emphasis is given to the cleaning and undercoating phases of the setup. The firm designed its own multi-station cleaning cycle. Here, cleaning and plating units have separate conveyor systems so cycle times can be controlled independently. Consequently, all problems resulting from inadequate cleaning are nil.

The departments' plating equipment offers high speed metal deposition and an improved labor-control technique. A special feature permits removal of racks after nickel plating (before chrome) for transfer to a unique bright brass plating line, if desired.

The system handles diecastings from 1 sq. in. up to 14 x 36 in. areas. Conveyor speed varies to accommodate up to 140 racks per hour.

One man is all that's required to operate the equipment to transfer the racks from cleaning to the plating line. Another man removes the racks to the bright brass line when required. A pushbutton-controlled

new...booming...stainless steels call for consistent analysis

TECHNICAL BRIEFS

MANGANESE	99.9% MINIMUM
CARBON	0.004% MAXIMUM
SULPHUR	0.024% MAXIMUM
IRON	0.001% MAXIMUM
HEAVY METALS	0.005% MAXIMUM
PHOSPHORUS	NOT DETECTABLE IN 25 GRAM SAMPLE
SILICON	SPECTROGRAPHIC TRACES ONLY
HYDROGEN	0.015% MAXIMUM

and ELECTROMANGANESE® has it

Stainless steel is on the move. Industry after industry is attracted by its recent strides in transportation equipment, appliances, architectural trim, household and store furnishings. And of all the stainless steels, the most stimulating seem to be the new 200 Series, characterized by high manganese, low nickel, content.

But—high manganese content also means consistent analysis in this critical alloying agent. The percentage of each impurity must be known and consistent in melt after melt. This calls for the purest commercial manganese available... Foote electrolytic manganese. Electromanganese, by trade name, consistently provides 99.9% manganese content in the analysis shown above. If you have a hydrogen problem, even this can be reduced to 7.5 ppm maximum in a *Hydrogen-Removed* grade. Nitrided manganese is available in Foote's high-purity Nitrelmang. But just as important as consistent analysis is economy. And here Foote's alloying agents enable you to get the necessary manganese content in the most efficient way.

The 17 years' experience in manganese alloying available from Foote's Electromanganese Division is an important first step when you decide to really pursue the growing stainless steel market. A letter will bring a Foote engineer to your desk. Or, you can get further information by writing to our Technical Literature Department, Foote Mineral Company, 438 Eighteen West Chelten Building, Philadelphia 44, Pa.

SALES OFFICE: Electromanganese Division, Knoxville, Tennessee

RESEARCH LABORATORIES: Berwyn, Pennsylvania

PLANTS: Cold River, N. H.; Exton, Pa.; Kings Mountain, N. C.; Knoxville, Tenn.; Sunbright, Pa.



ELECTROLYTIC MANGANESE METAL • WELDING GRADE ELECTRO ALLOYS • STEEL ADDITIVES • COMMERCIAL MINERALS AND OXIDES • ZIRCONIUM & TITANIUM IODIDE PROCESS • LITHIUM METAL, CHEMICALS AND MINERALS • STRONTIUM CHEMICALS

rack storage conveyor gets empty racks out of the way fast.

Application of more automatic handlers reduces labor on the polishing part of the plating operation. It includes automatic application of the buffing compound. The flexible unit handles various size and shape parts.

Washer Is 44-ft Long

Measuring 44 ft long, the automatic washer, phosphate coater and dryer section in the painting department is fully automated. If anything goes wrong with this unit, it shuts itself down; then it rings a signal in the foreman's office. Indicator lights on the setup show exactly when the trouble is. The phosphate coat deposited by this equipment is a controlled 200 mg per sq ft.



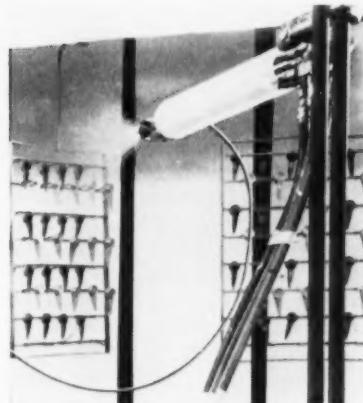
Spray rinses plating chemicals off fender mirror parts.

The electrostatic spray painting installation successfully applies a wrinkle finish and metallic paint. It has increased production of wrinkle-finish parts from the former 100 to 150 per hour to 1000 of them per hour. The electrostatic system includes a power pack which supplies a 150 kv (peak) at a maximum of 1½ milliamperes of current.

Shielding and baffling in the 12 x 14 ft booth is partly responsible for the system's success. Controlling at conveyor speed, liquid pressure of the paint, and atomization are other important considerations. Up to 12 spray guns can be used, but

normal practice requires only two.

Finally, the firm's combination radiation-convection oven provides an equivalent 30-minute bake for parts after only 20 minutes. Calrod tubes in the early portion of the



Electrostatic spray applies wrinkle finish to parts.

oven cycle bring parts up to heat quickly. No time is wasted in overcoming ambient temperature. This 14 x 25 ft oven can be increased in size at any time. At present, the oven contains about 50 ft of conveyors.

Metals:

Center punches have tungsten carbide tips.

Center punches with tungsten carbide tips are here. For six months, they have been experimental use on layout work, and they show some advantages over other less-expensive punches.

Use Two Types

Two types of these center punches are now in use by layout men at McLanahan & Stone Corp., Hollidaysburg, Pa. These include a large solid punch and a small self-operating or impact type. They have tips of tungsten carbide inserts $\frac{1}{8}$ in. and $1/16$ in. in diameter respectively. The tips are of suitable length for brazing into the ends of punches.

The tip of the large, solid punch is ground to a cone with approximately a 90° included angle. A 60°

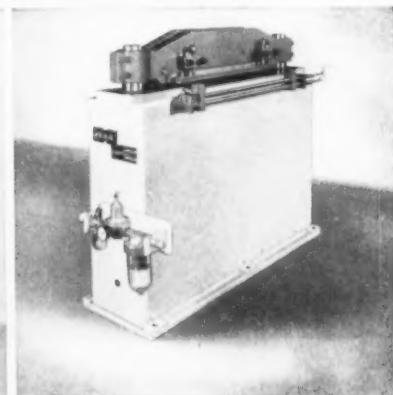


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Fast, dependable method of fastening the lead end of a new coil to the trailing end of a preceding coil. Entirely automatic. Produces a double row of locked stitches. Practical for strip of any width. Your samples stitched and returned promptly. Also automatic welders.



Fast acting single shears for use with hump tables in cut-to-length; and press feed lines, and other applications to square crop the end of a coil. Also twin cut shears that remove the section where two coils were stitched or welded together for continuous processing.



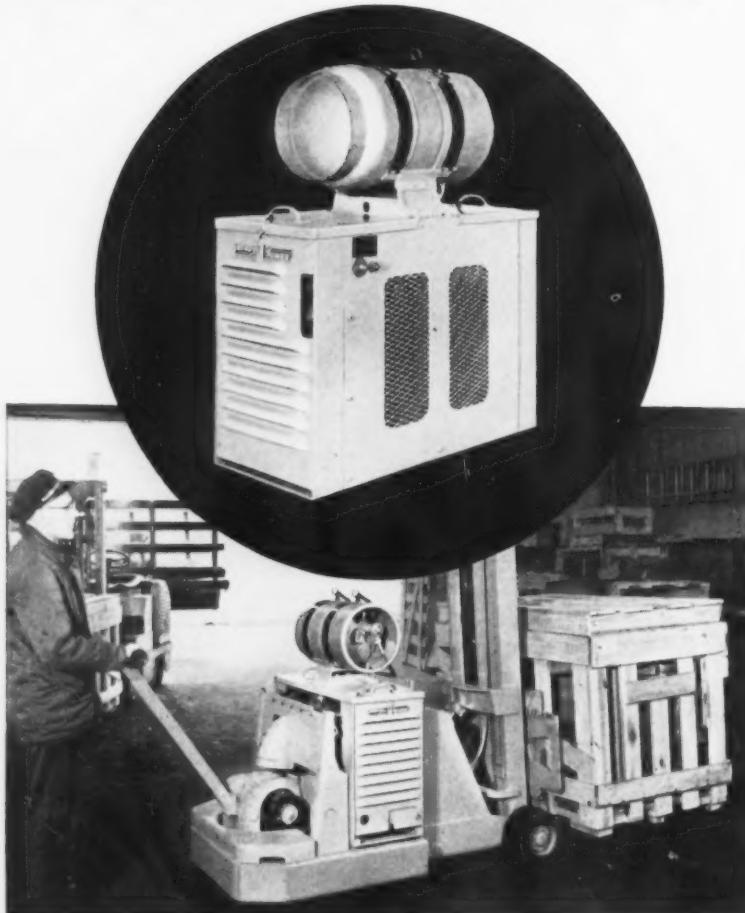
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New! Bantam Model W12 for Electric Powered Hand Trucks

Ready-Power combines full electric power *with no fatigue* AND the economy and low maintenance of LP-gas in one compact new power unit. Installation is quick and easy on any make of electric hand truck with adequate sized power compartment. Bantam model W12 accommodates an interchangeable 20-pound fuel cylinder, includes a quick-disconnect fuel line coupling for safety, has removable end plates and hinged cover plate for easy accessibility. LP-gas components are listed by Underwriters' Laboratories and comply with Factory Mutual recommendations. It's easy to convert your present trucks to this modern, full-production power. Specify "Ready-Power" when ordering new trucks. Write for information.

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Manufacturers of Gas and Diesel Engine-Driven Generators and Air Conditioning Units; Gas and Diesel-Electric Power Units for Industrial Trucks

included angle is used on the small punch. Points are diamond honed to a spherical radius of 0.005 to 0.008 in.

Tip Survives Punching

In six months of use on a variety of materials, including cast steel, forgings, stainless steel, and hard alloys, the shank of the large punch was reduced in length 2 in. by metal peening and regrinding; however, the tip, made of Grade K1 Kennametal, was still in good condition.

Conclusions from the use of these experimental punches are that: 1) the carbide tip takes the heaviest blows for deep impressions, 2) any given depth of impression requires a lighter blow with a carbide tip than with a steel tip, 3) clean work is produced in short time with



Layout men are experimenting with these center punches.

no rework to correct poor or off-location impressions, and 4) no regrinding or point conditioning is necessary.

Cost savings are reported, based on the time consumed in reconditioning steel punches during a six-month period and the re-work time necessitated by worn and rounded off punch points.

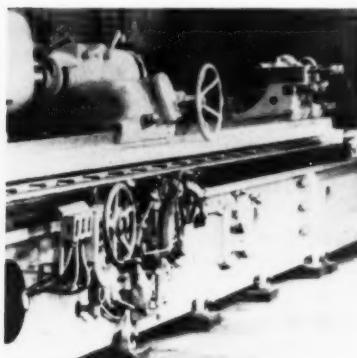
Machine Tools:

Grinder resists vibration; holds 0.0005-in. level.

A 45-ton Norton cylindrical grinder in the plant of E. D. Jones & Sons Co., Pittsfield, Mass., maintains an accuracy of 0.0005 in. This isn't too surprising for a close-tolerance grinder. However, the machine does this while stand-

ing 40 ft from a mainline railroad track.

With an ordinary setup, vibration from passing trains would cause chatter marks on finished work. After careful consideration, the plant superintendent found



Mounts between floor and grinder reduce vibration.

that accuracy could be maintained and vibration absorbed by putting the grinder bed on 26 mounts made of vinyl, sisal and cork. Between each mount, he placed a $\frac{3}{4}$ -in. steel plate.

A steel plate under the machine's bed permits leveling with jack screws. The mounts used with the steel plates absorb tremors from the trains. Yet they provide enough bounce to maintain the 0.0005 in. level requirement.

The mounts are made by Clark, Cutler, McDermott Co., Franklin, Mass.

Fabricating: Great Lakes carrier uses stainless propellers.

Stainless steel propeller blades have completed a successful season on a Great Lakes ore carrier.

The four highly polished, separable blades each weigh about 3-ton. They bolt to the propeller hub, replacing the one-piece high tensile non-ferrous blades normally used in large high-powered ships. The shiny bright stainless steel blades were cast and machined at Avondale Marine Ways in New Orleans, Louisiana.

Each blade is 7-ft 4-in. long, and is almost perfectly balanced with

Do you need better ways to strip paint?

When tough finishes resist your present stripping methods, you may need help on some of these problems:

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- 2 How to strip zinc chromate primers without etching aluminum.
- 3 How to strip paint from vertical surfaces and undersurfaces where thin-bodied strippers run off without doing their work.
- 4 How to strip metal parts that are too large to be soaked in tanks.
- 5 How to strip paint, pigment residues, phosphate coatings and rust in one operation.
- 6 How to strip paint from rejects, conveyor chains, racks and hooks in continuous operation.

Oakite has more than a dozen fine stripping materials for these and similar jobs.

FREE For information on problems 1, 2, 3 and 4 ask for a copy of "How to STRIP PAINT". For more on problems 5 and 6 ask for "Here's the best shortcut in the field of organic finishing". Write to Oakite Products, Inc., 30H Rector St., New York 6, N. Y.



Export Division Cable Address: Oakite

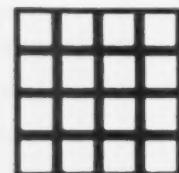
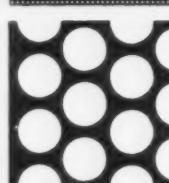
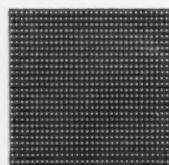
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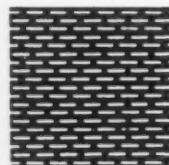
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Designers are discovering an ever-increasing range of applications for perforated materials. For functional or decorative purposes, or where a combination of both is essential, H & K perforated materials are used in more products, in more accessories, in more places than ever before.



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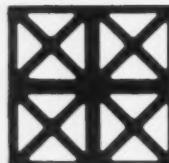
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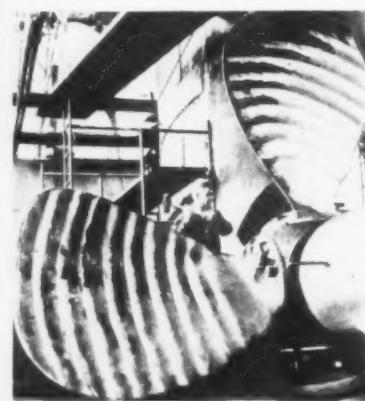
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TECHNICAL BRIEFS

sures of any existing or proposed steam turbine.

In the low pressure machine of this cross-compound unit, the turbine blades will rotate at 1800-rpm. They will be subjected to tremendous stresses. At this rotation, the tip end of the blades will travel at 944-mph.

its mate. This was accomplished by statically balancing the blades after they had been cast, finished, and assembled in pairs. Two extra blades were also manufactured to serve as replacements should the propeller be damaged



Machinist works on the shining stainless propeller blades.

while in service. Because of the great size of this propeller, special techniques in all stages of production had to be developed.

Steamship officials say the stainless blades are very efficient for the latest, high-powered ore carriers because they are tough and ductile.

Forgings:

**Giant hammer forges
big turbine blades.**

Unusually large turbine blades are forged under a 23,000-lb hammer at Westinghouse Electric Corp.'s metals development plant, Blairsville, Pa.

Heated to 2000°F, the white-hot, stainless steel blades are shaped by hammer blows equal to 475,000-ft-lb. Measuring 44-in. long each, 200 of the turbine blades are being forged for an advanced-type turbine-generator, now under construction at the company's Lester, Pa. plant for the Philadelphia Electric Co.

When completed the unit will be rated at 325,000 kw. It will have one of the highest efficiencies, operating temperatures and pres-

Machining:

**Cut-off machine eliminates
waste turret lathe time.**

A manufacturer of precision instrument parts eliminates a bottleneck often encountered in cut-off operations on the turret lathe. Cut-off, the firm discovered, can add up to three extra minutes to the production time for each piece, particularly when hardened metals are cut.

Jacy Mfg. Co., Brooklyn, N. Y., installed a Delta cut-off machine near its turret lathes for pre-cutting stock. This reduces cutting time to seconds. An operator cuts

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CO.**

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America of**

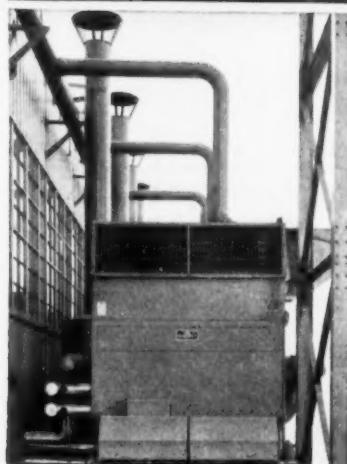
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...getting drier Compressed Air

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Extra, for no cost, you get drier compressed gas or air for your process. You get better operation and lower costs in the use of all air-operated instruments, machines, or paint sprays. You save expense for piping, pumping, water treatment and disposal. You get the use of badly needed water elsewhere in your plant.

Niagara Aero After Cooler cools compressed air or gas (evaporatively) below the temperature of surrounding atmosphere, with no further condensation in your air lines.

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TECHNICAL BRIEFS

off a dozen or more pieces per minute. Chucking the pieces individually, an additional operation required with pre-cut pieces, takes about the same time.

On some jobs the lathe operator cuts pieces on the cut-off machine while the lathe is operating, reducing work time per piece further.

Precutting pieces also insures an accurate cut. Pressure of the turret lathe cutting tool against the stock sometimes causes slight angling in cutting. When cut on the cut-off machine, the stock is firmly supported on both sides, insuring an exact 90° cut.

Testing:

Steel supplier uses
spark testing method.

One of the important steps in the certified steel plan developed by Joseph T. Ryerson & Son, Inc. is the spark testing of alloy bars. This method makes sure that all bars are of the same analysis. Thus, no mixed steels result. It



Trained operator applies grinder and evaluates sparks.

consists of a visual examination, by a trained operator, of the sparks thrown off when the steel is touched with a grinding wheel.

Checking for analysis variation at this stage can eliminate many possible sources of trouble later. It makes highly improbable the delivery of the wrong steel to a customer's shop.

TMI TUBING

WORKS WITH YOUR

RESEARCH AND
DEVELOPMENT ENGINEERS



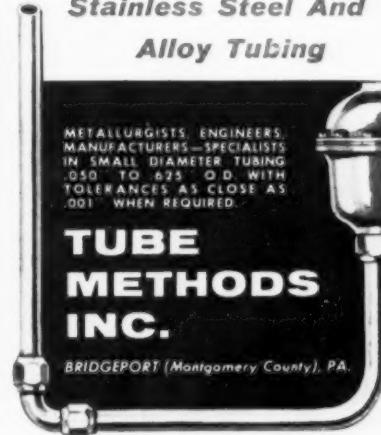
Experience like ours in the cold drawing of stainless steel and special alloy tubing didn't come easy. It is the aggregate of thousands of "impossible" problems solved by the combination of better equipment, pioneering know-how and conviction that there is really no limit to the performance of stainless steel and special alloy tubing... "IF it's handled right from the start"! That's why we feel at home "in conference" with your problems. *Your success is our success.*

This Symbol



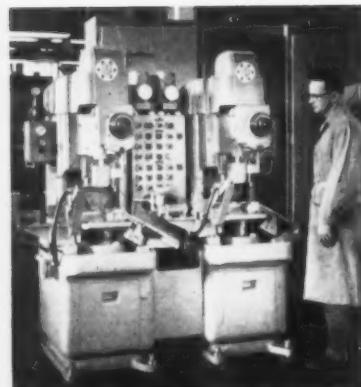
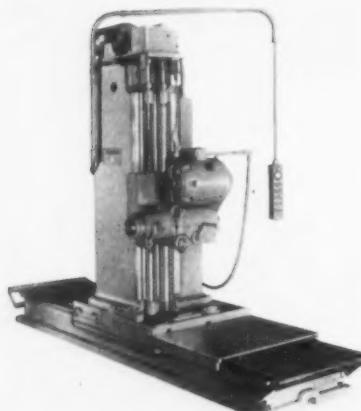
Opens Up

*Boundless Horizons
Of Accomplishment
For Small Diameter
Stainless Steel And
Alloy Tubing*



NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies... for more data use the free postcard on page 137 or 138.



Pendant-controlled miller works cumbersome jobs

Cumbersome milling jobs are normal jobs for this pendant-controlled milling machine. The wide range of horizontal and vertical travels available make this machine ideally suited for such work. Vertical travel of the spindle head is: 36, 48 or 60 in. Horizontal travel of the column is: 48, 72, 96 or 120 in. Height of the runway is 14 in. A pendant station controls the 20-hp main drive motor and the multi-speed feed motors. It has a horsepower meter mounted on the pen-

dant. A hand wheel, with a dial reading in thousandths of an inch, adjusts the spindle. Spindle speeds are 400, 972 or 1620 rpm. Feed to the head and column are 30, 40 or 60 ipm. Taper in the spindle head is No. 50 NMTBA Standard with draw bar. The column and head of the machine are heavily-ribbed, box-section alloy castings. It has non-metallic ways on the head and column base. *The Cincinnati Gilbert Machine Tool Co.*

For more data circle No. 27 on postcard, p. 137

Honer provides accurate locating surfaces on pieces

Completely automated, this micro-honer generates a workpiece's end square with the parallel end faces; this provides accurate locating surfaces for subsequent operations. It holds close tolerances at a high production rate. The unit allows accurate work to within ± 0.0003 -in. on the size, ± 0.0003 -in. bore-to-face-squareness, and ± 0.0001 -in. roundness and taper. A large capacity loader automatically loads, while a gravity chute carries parts

to a pre-feed position. A plunger moves parts onto the fixture table. As the table rises, the part slips over the tool which expands to align the part with the spindle. The part then clamps on its end faces, in the fixture, square with the spindle. Automatic sizing ends the microhoning cycle when the bore is to the required diameter. An air-gage after-gages finished parts. *Micromatic Hone Corp.*

For more data circle No. 28 on postcard, p. 137

Submerged arc welder has 300 to 1000 amp range

With an operating range of 325 to 1000 amp, this ac transformer welder is primarily a power source for the submerged arc process. The single-phase welder has motor driven current control. Using a plug and receptacle, remote control of both welder output and primary contactor is available, in addition to the controls mounted permanently on the welder case. With output open-circuit voltages of 85 to 100-v, the unit has power factor correction capacitors and operates

on a reconnectable 230/460-v input. Built into the welder is a 2-kva control transformer; this can be used externally for operating of auxiliary equipment. The unit is rated for continuous duty cycle at 1000 amp. All coils are protected by class "H" insulation, rated for 130°C temperature rise. A built-in current transformer, ratio 1500/5, is provided to aid measurement of welding current. *Welding Dept., General Electric Co.*

For more data circle No. 29 on postcard, p. 137



The Series "700" "Load Lifter" has the fewest possible working parts to simplify maintenance. All units are easily accessible for inspection; the hoist can be serviced in the air. Down time is reduced — real economy for you.



This efficient motor-driven trolley provides effortless hoist travel at the push of a button. Available for Series "700" "Load Lifter" Hoists already in service. New hoists can be so equipped before shipment; no additional assembly required.

STEP UP lifts per hour

Lifting loads up to 15 tons on a heavy-duty cycle is a job for a tough hoist. The Series "700" "Load Lifter" Electric Hoist more than meets every requirement in speed, stamina and safety. A ton can be lifted a foot a second. Extra ruggedness is built into every part to assure top performance under the worst conditions of service. The automatic load and motor brakes are interlocked to operate simultaneously, yet either brake alone can hold the full load safely. Only 24 volts at the pendant

STEP DOWN cost per lift

control is a plus in safety. Two-speed models provide a "low" that is 1/3 the speed of "high".

The Series "700" "Load Lifter" is available with lug or hook and push-type, hand-gear or motor-driven trolley. Learn how this husky electric hoist is saving time, effort and money in all kinds of plants, and how it can do the same for you. Ask your "Shaw-Box" Distributor for details or write us for Bulletin 410.



Load Lifter®

ELECTRIC HOISTS

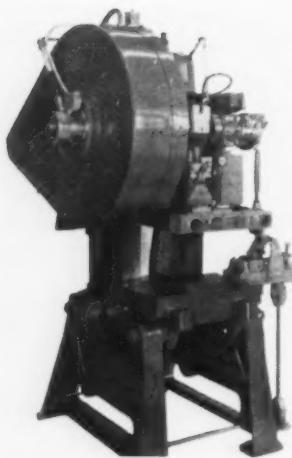
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SHAW-BOX CRANE & HOIST DIVISION

382 West Broadway • Muskegon, Michigan

Builders of "SHAW-BOX" and "LOAD LIFTER" Cranes, "BUDGIT" and "LOAD LIFTER" Hoists and other lifting specialties. Other Divisions produce "ASHCROFT" Gauges, "HANCOCK" Valves, "CONSOLIDATED" Safety and Relief Valves, "AMERICAN" and "AMERICAN-MICROSEN" Industrial Instruments, and Aircraft Products.

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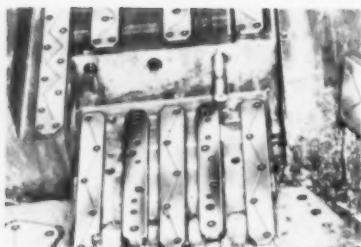


Press has either right or left hand flywheel mounting

This press comes with either right or left hand flywheel mounting. Standard right hand flywheels are sometimes inconvenient for those who have dies arranged for right to left manual feeding and wish to change to automatic feeding. The flywheel cuts down on the space for working on the automatic feed. Obtaining the power for the feed is quite often costly and intricate. By having presses which have left hand flywheel mounting, the present dies can be used; the open shaft provides handy power for the feed. By having left hand flywheel

mountings, plant layouts in the press room can be assisted greatly, according to the manufacturer. There is considerable flexibility allowed in arranging for both manual and automatic feed operations. Using this unit, sometimes a great deal of floor space can be saved. The press' makers state that the left hand flywheel mounting is presently available on all its air clutch units in 10 ton models. Larger units are also available. *Press-Rite Div., Sales Service Machine Tool Co.*

For more data circle No. 30 on postcard, p. 137



Aluminum bronze wear plates machine easily

Many automobile manufacturers are now using aluminum bronze wear plates for dies with cam or sliding action. These aluminum bronze wear plates are made by a cladding process which bonds long-wearing aluminum bronze to a steel base. This base is easily machin-

able for fitting to dies. Drilling or counterboring through the bronze surface is done without difficulty when necessary. The plates are ground to ± 0.0005 parallel and flat, according to the manufacturer. *Ohio Knife Co.*

For more data circle No. 31 on postcard, p. 137

SUPER MARKET SHOPPING

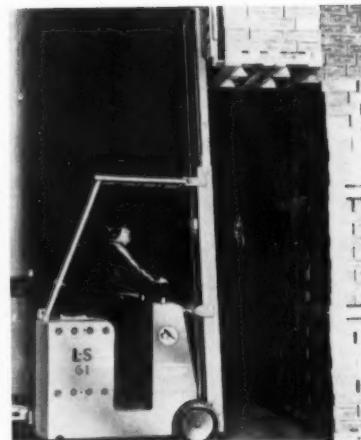


Fork lift trucks operate in sub-freezing areas

Electrically powered fork trucks now operate in sub-freezing areas, thanks to special equipment. Among several optional features that make this possible is completely corrosion-resistant construction. This includes a brake enclosure; chrome plated brake cams; special hydraulic oil and lubricants in the drive-axle housing and steering box; sealed bearings with water resistant lubricants, and protective coating on the truck's underside. Other options are: a heated control panel, bumper strips on the side and rear and a stainless steel steering chain.

In addition, extra-thick forks, spotlights and canvas padding for the battery compartment are offered. The trucks using this equipment are operated from a standing position while riding. Since operators are frequently required to mount and dismount their trucks while wearing heavy clothing, the "stand-rest" driving position has proved the most popular with them. Capacities of the trucks extend from 1000 to 4000 lb. Fork elevations range from 100 to 147 in. *Lewis-Shepard Products, Inc.*

For more data circle No. 32 on postcard, p. 137

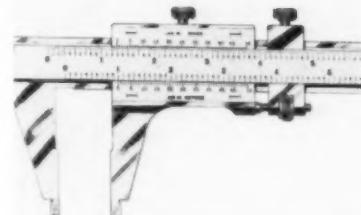


Vernier calipers are accurate, easily read

Accuracy, easy and fast setting and reading, rigidity and long life are features of new precision vernier calipers. The long 50-division vernier scales with widely spaced graduations simplify setting and reading without use of a magnifying glass. This feature permits

half the conventional number of graduations on the bar. Both vernier plates fit flush with the main scale. This eliminates reading errors due to parallax. It comes in 12- and 24-in. sizes graduated in thousandths. *L. S. Starrett Co.*

For more data circle No. 33 on postcard, p. 137



FOR CUSTOMIZED CONVEYORS WITH MAY-FRAN STANDARDIZATION

Developed to provide the ultimate of versatility, the May-Fran program of **STANDARDIZATION** permits users to create and construct their own conveyors to meet individual needs.

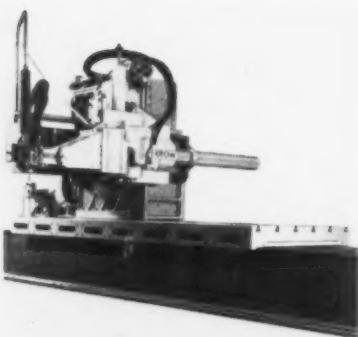
It literally provides a type of "super market" shopping for the straight, curved, inclined, take-up and discharge end sections required to meet the specifications of **YOUR** job requirements. Sections can be furnished to meet belt width as well as load bearing and volume capacities. Conveyors can be changed relative to length or width with only a minimum of downtime.



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ask for a copy of
MF Bulletin No. 200

MAY-FRAN

ENGINEERING, INC.
1698 Clarkstone Rd. • Cleveland 12, Ohio



Machine profiles in steel, aluminum or titanium

Using a hydraulic tracing valve, a profiler performs high production 360° profiling, three-dimensional contouring and swarf or twist machining in steel, aluminum or titanium. The operator manually traces a template and the cutting tool machines profiles or three-dimensional contours accurately within 0.005 in. For swarf or twist cuts, the spindle mounts on arc-shape ways. This permits the

spindle to pivot 20° either side of the vertical centerline. A second tracing valve mounted on the cross carriage actuates the spindle's pivoting action. Using a 20-hp hydraulic powered spindle with speeds from 37 to 3000-rpm, the profiler has the necessary range and power to machine steel as well as aluminum and titanium. Speed changes are made through pick-off gears, providing up to 30,000-in.-lb of torque at 37-rpm. The table measures 42 x 144 with 136-in. travel. *Arrow Engineering Co., Inc.*

For more data circle No. 34 on postcard, p. 137

from the hand of the Specialist To Your Specifications



ERIE

Bolts • Studs • Cap Screws • Nuts
In Alloys • Stainless • Carbon • Bronze

Only the hands of the specialist can produce fasteners which will meet your design and engineering specifications with precise accuracy. Erie has been doing just that for more than 40 years . . . producing to customer specifications bolts, studs, cap screws and nuts for use in extreme temperature, corrosion and tensile applications for a wide diversity of industries. Submit your specifications to us with confidence.



ERIE BOLT & NUT CO.

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Representatives in Principal Cities

Furnace

Ready interchangeability of furnace components make this vacuum furnace suitable for melting, annealing, brazing, sintering, and degassing. It is a compact, completely self-contained unit with a 3-in. ID x 6-in. high stabilized zirconia crucible suitable for melting 12 lb (of steel) at up to 2000°C. The furnace is tilt pouring, with a rotary mold turntable. It provides



for melt additions, a bridge breaker, and a dip thermocouple. The unit also can adopt instrumentation for reproducing melt conditions from heat to heat. The spherical vacuum chamber opens to allow easy access to all vacuum components. Furnace and vacuum controls feature ease of operation with sight ports with shields and wipers located on the chamber to provide a view of the furnace and molds. *High Vacuum Equipment Corp.*

For more data circle No. 35 on postcard, p. 137

ATOMS-FOR-PEACE
HELP ROLL AND CONTROL
DSC STRIP



**DSC adopts stripmaking improvements so users
can get the most out of the product**

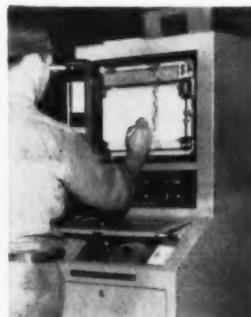
**DSC KEEPS PACE WITH
STRIPMAKING ADVANCES**

COLD ROLLED STEEL STRIP is and always has been one of our bread-and-butter lines. That's why we try to keep abreast of all advances in strip-making methods and practices.

Our two main purposes are (1) to keep our operations efficient and competitive; (2) to help strip users get the most out of the product.



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THICKNESS RECORDER

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DETROIT MILL DIVISION, DETROIT, MICH.
EASTERN MILL DIVISION, HAMDEN, CONN.

Cold Rolled Carbon Steel Strip
Flat Cold Rolled Carbon Spring Steel



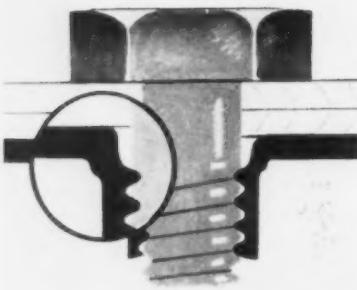
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**DETROIT STEEL
CORPORATION**

GENERAL SALES OFFICE, DETROIT 9, MICHIGAN

CUSTOMER "REP" OFFICES:

Charlotte, N. C., Chicago, Cincinnati, Cleveland, Columbus, Ohio, Dayton, Ohio, Detroit, Grand Rapids, Mich., Hamden (New Haven), Conn., Indianapolis, Jackson, Mich., Louisville, Ky., New York, St. Louis, Toledo, Worcester, Mass.



Anchor nut features thread-relief design

A new style all-metal self-locking anchor nut features light weight and a thread-relief design. It is interchangeable with other designs. The new thread-relief design, by eliminating threads in bearing, helps to insure a structurally sound joint. By allowing the bolt grip to enter the base of the nut, it substantially reduces the need for shims and changes in bolt-grip

lengths. This locking device plus the heat treated threads permits repeated insertions and removals of mating screws without loss of locking ability. Carbon steel nuts are approved for use in temperatures up to 550°F. For higher temperature or non-magnetic applications, nuts of A286 corrosion resistant steel are manufactured. Now available in a complete range of sizes from 8-32 through $\frac{3}{8}$ in.-24, the self-locking anchor nut with thread-relief is precision made in accordance with all applicable military specifications. *The Kaynar Co.*, For more data circle No. 36 on postcard, p. 137

WEBB PLATE FABRICATING MACHINERY

Steelworkers ALL STEEL CONSTRUCTION

DELIVERY 10 DAYS

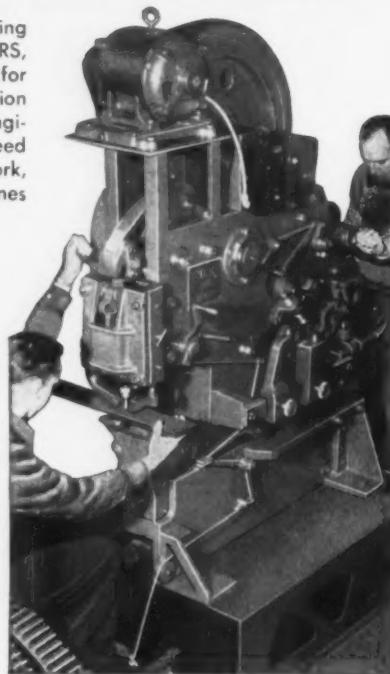
The Webb Corporation, in presenting the line of new WEBB STEELWORKERS, has designed versatile machines for either job-work or high production work. These units have been engineered to meet the particular need of shops having a variety of work, with a result that all-purpose machines are now available.

Five Complete Tools are Incorporated in a Single Unit.

1. Punch for plate, bars or structural.
2. Cuts angles and tees with straight or miter cut.
3. Cuts off round and square bars.
4. Shears plates and bars.
5. Coping or notching attachment.

One of the main features of these machines is that they are at all times in complete readiness to do any of the above operations and to do the work well.

The punch may be operated at the same time as either the section cutter, bar cutter, shear or the coping and notching attachment . . . therefore, two operators can work at this machine simultaneously without interference. For illustrated literature and prices, write Dept. E.



Let Speed PAY-The WEBB Way!



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PYRAMID TYPE ROLL



INITIAL TYPE ROLL



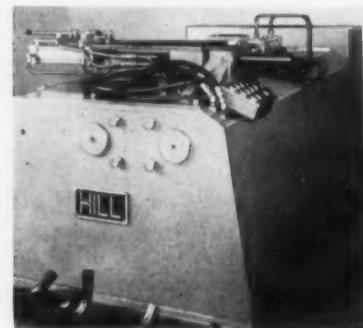
STEELWORKERS

Also Manufacturers of INDUSTRIAL WEIGHING EQUIPMENT

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wiper die assembly. This arrangement provides considerable operator safety. Bending can be done with or without a mandrel according to tubing requirements. The wiper die and mandrel assembly move with the tubing as it is bent. This avoids die marks and wrinkles in the bent parts. A 1000-psi hydraulic system powered by a 30-hp motor and a 40-gpm pump operates the ram, mandrel and wiping die cylinders. The machine occupies a floor space about 5 x 8 ft; it is 45 in. high. *Walter P. Hill, Inc.*

For more data circle No. 37 on postcard, p. 137



CONTINUOUS BAR MILL

Designed and Built by

UNITED



UNITED ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

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Subsidiaries: ADAMSON UNITED COMPANY, AKRON, OHIO
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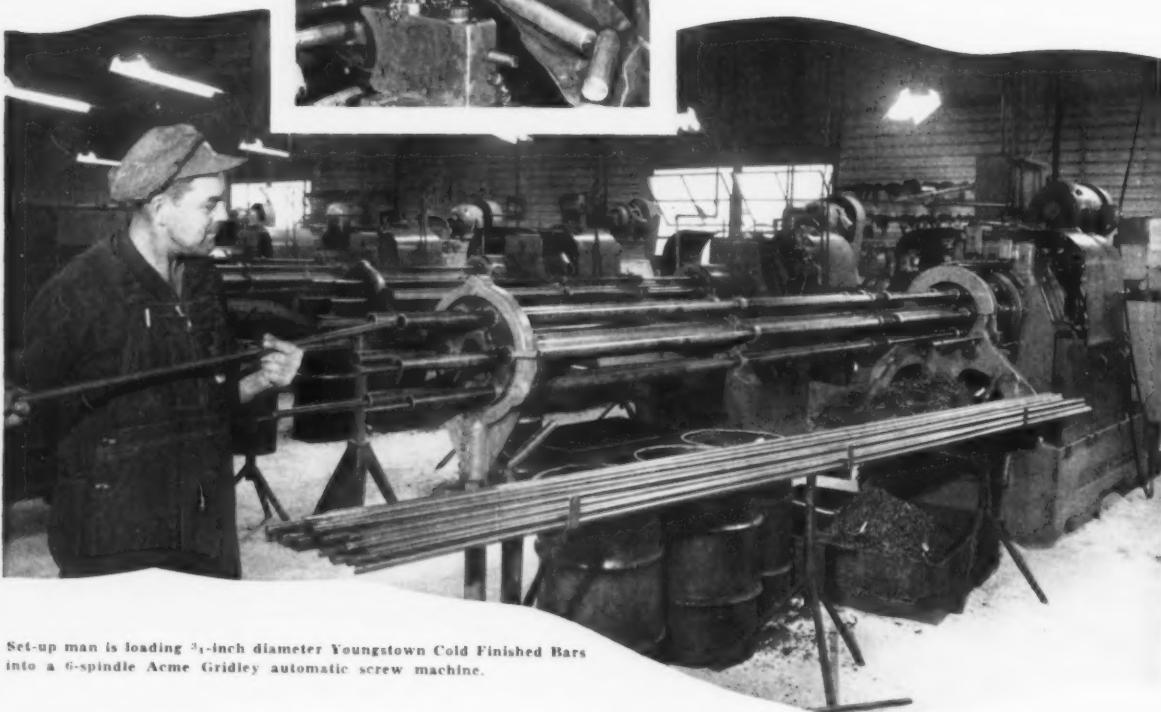
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Designers and Builders of Ferrous and Nonferrous
Rolling Mills, Mill Rolls, Auxiliary Mill and Processing
Equipment, Presses, and other Heavy Machinery.
Manufacturers of Iron, Nodular Iron and Steel
Castings, and Weldments.



Studs for process machined from Youngstown cold finished bars

Close-up of studs being bored to accommodate their charge of flux (top collet) and then cut-off (center collet). Two finished Nelweld studs, shown in the pan in foreground, were machined simultaneously in the 6-position machine. First operation—feed out and face; second—bore; and third—cut-off.



Set-up man is loading $\frac{3}{4}$ -inch diameter Youngstown Cold Finished Bars into a 6-spindle Acme Gridley automatic screw machine.

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices - Youngstown 1, Ohio

District Sales Offices in Principal Cities

Progressive fabricators rely on the Nelweld method for fast, dependable end-welding of studs to steel surfaces. This novel electric arc process—utilizing flux-filled steel studs—substantially reduces direct fastening costs when used to replace conventional time-consuming methods such as drilling, tapping, hard welding, through-bolting or the securing of straps and rivets.

To maintain their world-wide reputation for product quality and uniformity, Nelson Stud Welding, a division of Gregory Industries, Inc., uses Youngstown Cold Finished Bars as the basic material for stud production.

Youngstown Cold Finished Bars provide high machinability and greater uniformity of composition, structure and surface finish to help you increase production of more uniform parts. Always specify Youngstown—it's your best assurance of quality.

Why not call or write your nearest Youngstown District Sales Office today for additional information or metallurgical assistance?



Cold finished bars

Odometer records job data on crawler-type tractors

For use on crawler type tractors, this unit aids machine operators in recording accurate job data. The newly designed odometer precisely records distances traveled by the tractors. It can easily mount on both spoke type and disk type idlers. The unit gives excellent accuracy in the low speed ranges, reports its manufacturer. It registers positive mileage in both for-

ward and reverse gears. The odometer provides 98-pct accuracy in the lower three gear ranges. In fourth gear, 90-pct accuracy can be obtained. However, the recording mechanism does not operate in fifth gear. Since most jobs are performed in the lower speed gears, the unit will supply a valid reading of working distances on most jobs.

Caterpillar Tractor Co.

For more data circle No. 38 on postcard, p. 137



Combination fixture

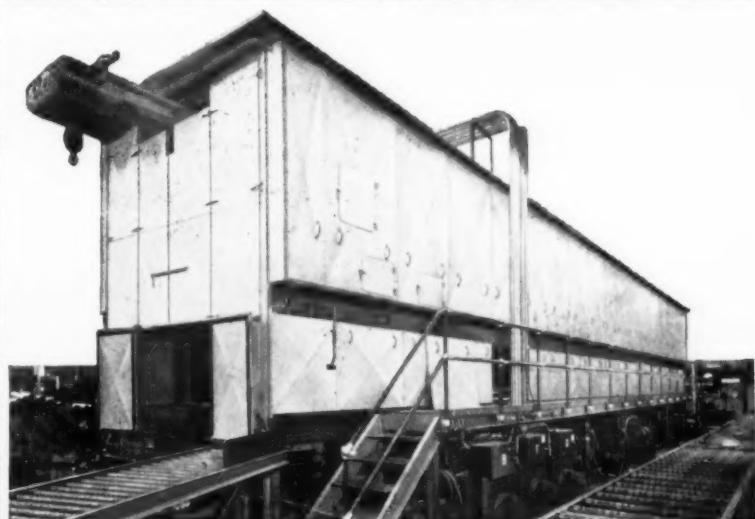
Of one-piece construction, general-purpose parallel and V-block combination fixtures safely support work on drill presses, benches, surface plates, etc. Probably their key feature is the elimination of smashed fingers, a hazard faced when using loose supports. These fixtures are recommended as especially useful to the diemaker when mounting punch plates to punch holders for drilling. The center is open to accommodate the punch shanks. The V's at each end can easily adapt as a drill jig for



rounds. There is no need to stop to remove burrs from each hole when drilling a number of holes in flat pieces. The fixtures come in two sizes: 3 1/4 wide x 9 long x 2 1/4-in. high, and 4 1/2 wide x 12 1/2 long x 3-in. high. Both have accurately machined in line V-blocks at both ends for round stock. The smaller model features correct height for punch-holders with 1 9/16-in. diam shanks. The larger one provides for 3-in. diam shanks.

Illinois Metal Products.

For more data circle No. 39 on postcard, p. 137



HEAT TREATING MECHANIZATION

IS A FAMILIAR STORY TO AJAX!

■ In hundreds of applications, complete heat treating cycles are handled automatically by conveyorized salt bath installations engineered from beginning to end by Ajax.

From small parts to big ones; whether difficult shapes or selective heating requirements, the work is done faster . . . at less cost . . . in less floor space . . . with exceptionally uniform results.

From single furnaces to elaborate combinations, each operation is automatically operated and controlled, and the human element eliminated.

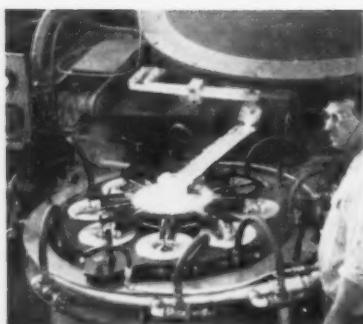
Exceptionally broad experience with merry-go-round, jackrabbit, screw conveyor, rotary basket, swing, elevator, push-pull and other heat treating mechanisms gives Ajax a head start on solving your mechanization problem the minute you bring it to us.

Send details
of your proposed installation
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Associates: Ajax Engineering Corp.
Ajax Electrothermic Corp.



Automatic unit casts cakes, slabs, billets

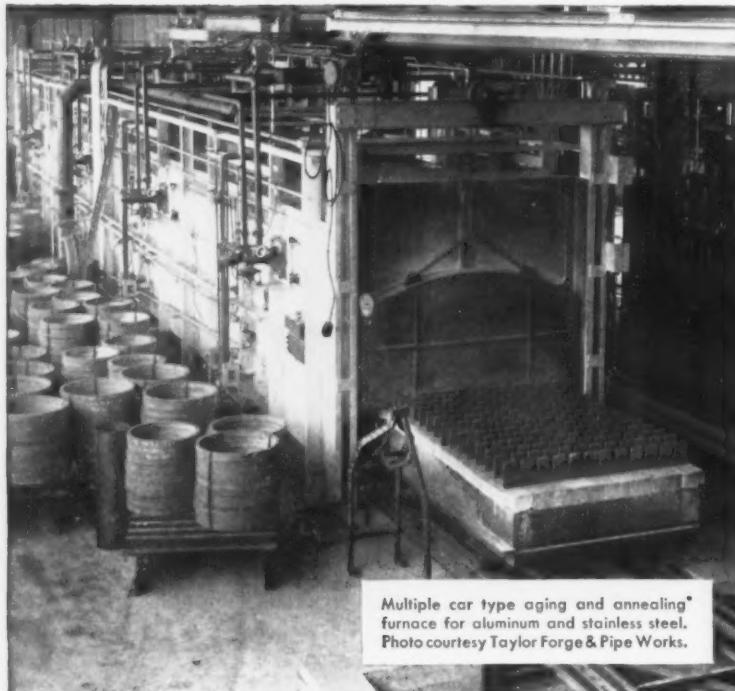
Handling both heavy and light non-ferrous metals, a new continuous casting machine offers high productivity, coupled with high quality ingot. The casting units are compact and simple to operate. They cast a wide variety of shapes varying from round extrusion billets, solid and hollow, to rectangular rolling mill cakes and slabs. The machines produce billets from 3 to

20-in. diam and larger. Simultaneous casting of as many as 20 multiple strands is feasible. *Lobeck Casting Processes, Inc.*

For more data circle No. 40 on postcard, p. 137

Push-pull tapper

This push-pull tapper, attaches to any portable drill. It is an instant-reversing speed reduction unit which can drive a tap into any size hole up to 5/16-in. diam. The speed reduction provides sufficient torque to tap in any material; the instant-reversing feature allows the tap to be withdrawn easily and quickly



Multiple car type aging and annealing furnace for aluminum and stainless steel. Photo courtesy Taylor Forge & Pipe Works.

Increase Production...Lower Production Costs with

LOFTUS Industrial FURNACES

For years Loftus Industrial Furnaces have been providing dependable, economical service to all the metal industries. Their long life and efficient performance have been proven by time. The fact that they materially contribute to lower cost operation and increased production is a matter of record.

Whatever your melting, heating

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without stopping or reversing the drill motor. Unique fingertip control for stopping and reversing the tap also enables the operator to "feel" any unusual strain in the tapping operation, thereby reducing tap breakage. *Supreme Products Corp.*

For more data circle No. 41 on postcard, p. 137

Copper finisher

Brown and shiny blue-black finishes show-up on copper and copper base alloys when using a new material. The brown colors apply uniformly on almost all copper alloys. Blue-black and brown colors appear on brasses containing 20-pct or more of zinc. Due to the fact that the finishes formed are oxides, no subsequent crystal spotting occurs. The adhesion of the finishes is very good. Work can be severely deformed without causing the coating to flake. Attractive two-tone effects can be obtained by relieving portions of the oxide coating. *Enthone, Inc.*

For more data circle No. 42 on postcard, p. 137



HERE'S WHY —

GREAT CLOSING POWER: Combination block and tackle with lever arm action.

DUMPS FULL PAY LOAD: No stiffening plates or braces to collect material.

NO SIFT-OUT: Positive scoop alignment. Hand automatic or electric trip available.

Engineered to give full payloads rehandling loose to semi-compact materials like coal, sand, gravel, foundry refuse, mill scale. Can be fitted with teeth for light digging.

Send for Catalog. Write Dept. A27

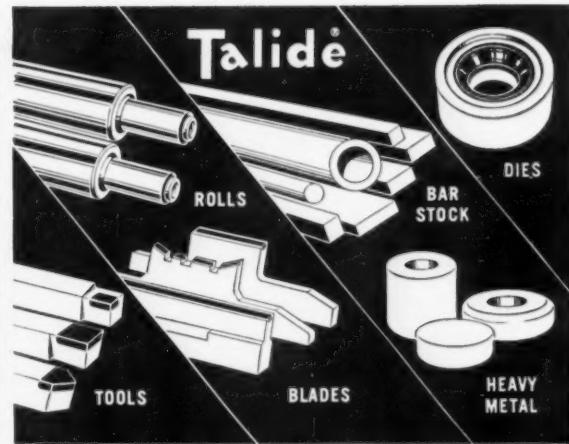
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MORE LOADS PER HOUR: Erie's exclusive open and close cycle is fast and sure.

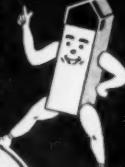
READY IN A JIFFY: Hooks on or off in less than a minute.

USE IT ANYWHERE: Overhead cranes, monorail hoists, locomotive cranes, ships' tackle.



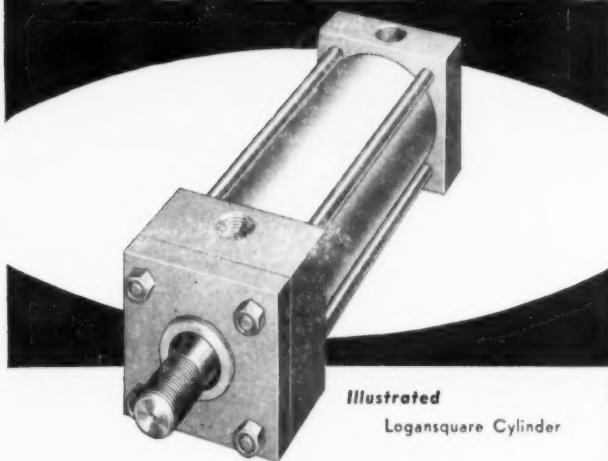
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• New, improved TALIDE METAL is uniform in quality—gives top performance on ALL cutting, drawing and wear-resistant applications. Write for Catalog 56-G, METAL CARBIDES CORP., Youngstown 12, Ohio.



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LOOK TO LOGAN



Illustrated
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Designed for low and medium pressures in either air or oil service, Logansquare cylinders meet a wide range of mounting applications and power movement needs. Regardless of your production requirements, Logan has the air or hydraulic components to serve you best.

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LOGANSQUARE CYLINDERS ARE
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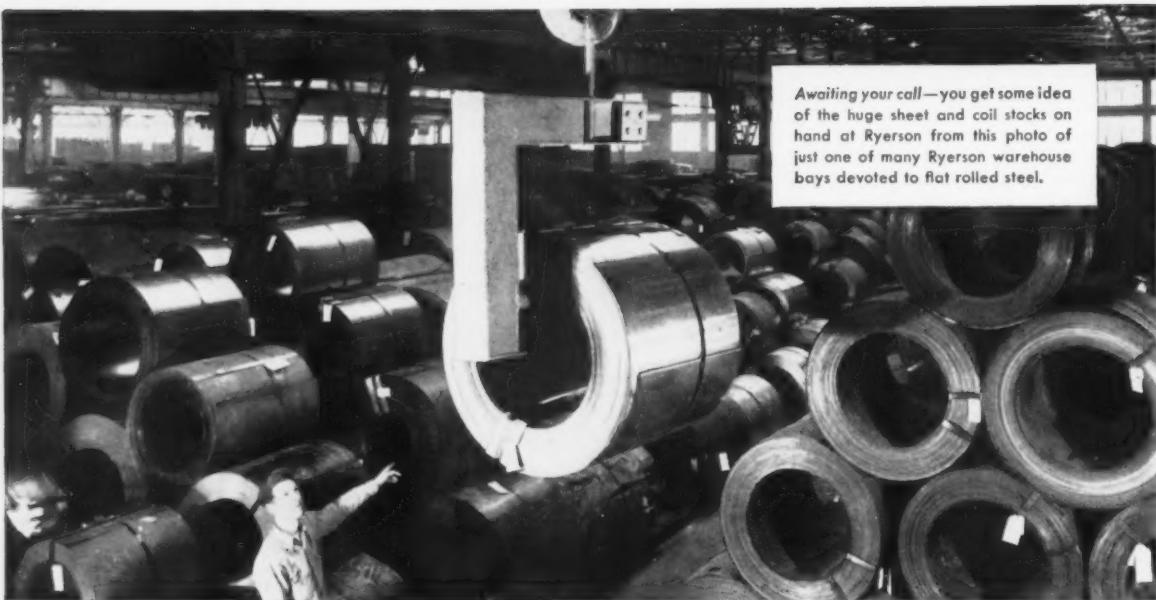
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Awaiting your call—you get some idea of the huge sheet and coil stocks on hand at Ryerson from this photo of just one of many Ryerson warehouse bays devoted to flat rolled steel.

On sheet and strip requirements... are YOU getting this 3-point service?

Sheet and strip buyers tell us that three kinds of purchasing help keep them coming back to Ryerson:

1. WIDER SELECTION OF TYPES—More than 20 kinds of sheet and coil stock are on hand in an unusually wide range of gauges—making it easier to get the exact steel needed for any requirement.

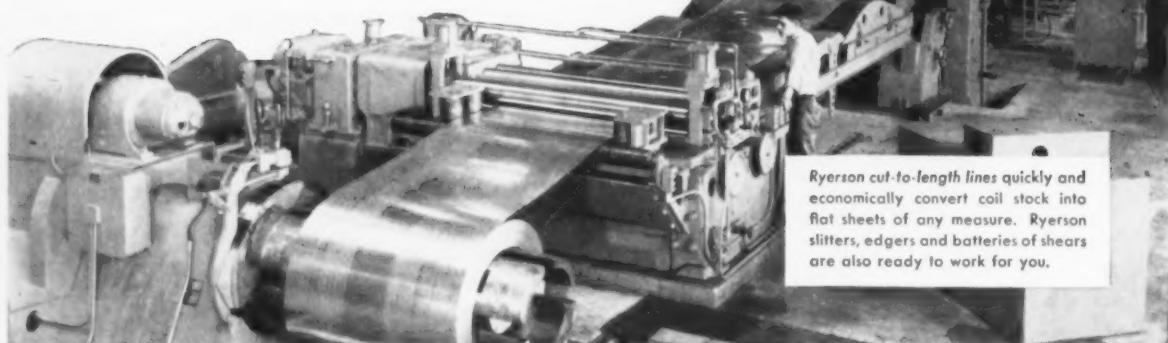
2. GREATER PROCESSING CAPACITY—The most extensive cutting and processing facilities in the steel-service industry enable buyers to get quickest service on requirements for special sizes, strip and sketch cutting, blanks, slit coils, edging, or any other processing.

3. HELP ON SHEET AND STRIP PROBLEMS—The large Ryerson staff of sheet and strip specialists gives buyers a valuable source of help in selecting the most satisfactory and economical stock—or in solving any other problem of application and fabrication.

In addition, sheet and strip buyers like the good packaging, the dependable weight and on-schedule delivery that they get from Ryerson—and the convenience of one-order buying of all steel products from the same source. So call your nearby Ryerson plant for 3-way help on sheet and strip needs.

RYERSON STEEL

In stock: Carbon, alloy and stainless steel . . . bars, structural, plates, sheets, tubing, reinforcing bars, machinery & tools, etc.



Ryerson cut-to-length lines quickly and economically convert coil stock into flat sheets of any measure. Ryerson slitters, edgers and batteries of shears are also ready to work for you.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE • CINCINNATI
CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

The Iron Age SUMMARY...

There will be no sharp decline in steel demand this year . . . The softening in sheets and strip reflect return to normal seasonal influences . . . Third quarter low point.

The Real Picture . . . A sharp decline in steel demand is out of the question this year. A survey by THE IRON AGE indicates that the recent easiness in demand for some steel products reflects a return to normal seasonal market influences—nothing more.

The easier tone in the sheet and strip market has been built up for more than it's worth. The tipoff is that mills who have made half an effort to book flat-rolled business have been able to fatten their order books.

An IRON AGE check of mills and major users suggest that the overall ingot rate will show a slight decline in second quarter. Mills now operating at above capacity may have to cut back to a less hectic pace, barring a sudden turn in international relations.

Here's how the steel picture shapes up for the year: first quarter, 96 pct of capacity; second quarter, 90 pct—or slightly better; third quarter, 80 to 84 pct (usual summer decline); fourth quarter, 88 to 90 pct. Overall for the year: 88-90 pct.

What It Means . . . The trend toward a normal buyer-seller relationship in sheet and strip reflects a growing tendency to reduce inventories. Automotive has taken the lead. Automotive parts

makers, appliances, and warehouses are not far behind.

Actually, steel business is good. Some mills continue to operate at above capacity. Incoming business is running in a range of slightly less than 90 pct up to 100 pct of shipments, depending on the company and its product mix. Mills heavy on sheet and strip capacity are feeling the trend more than companies with a better balance between heavy and light steel products. The plate, structural, and pipe markets are strong.

Plate users are getting some relief from the dropoff in demand for sheet and strip. This is because some mills are producing light plate to take up the slack on sheet and strip mills. Structural users also are benefiting, but not much. Some structural mills were working close to capacity before the easier tone in sheet and strip made itself felt. Users of light structural shapes probably will get the best break.

Consumption Up . . . Some makers of flat-rolled products have shown a decline in backlog over the last two weeks. A further decline is expected this week. A seeming paradox is that customers are consuming more steel than they did a year ago overall—the difference is being made up by taking flat-rolled items from stock.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,484	2,496	2,484	2,437
Ingot Index				
(1947-1949=100)	154.6	155.4	154.6	151.8
Operating Rates				
Chicago	95.0	94.0	98.0	98.5
Pittsburgh	98.0	99.0	99.0	103.0
Philadelphia	105.0	105.0	104.0	102.0
Valley	95.0	96.0*	98.0	98.0
West	103.0	100.0*	100.0	103.0
Buffalo	105.0	105.0	105.0	105.0
Cleveland	95.0	99.0*	98.0	109.0
Detroit	103.0	100.0*	105.0	104.0
S. Ohio River	87.0	83.0*	88.5	91.0
South	95.5	95.0	100.0	96.5
Upper Ohio R.	103.0	104.0*	103.0	104.0
St. Louis	91.0	99.5	100.5	104.0
Northeast	40.0	31.0	31.0	85.0
Aggregate	97.0	97.5	97.0	99.0

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)				
	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.650*	5.622	5.622	5.174
Pig Iron (Gross Ton)	\$62.90	\$62.90	\$62.90	\$59.09
Scrap, No. 1 hvy (Gross ton)	\$53.33	\$53.83	\$59.17	\$49.00
Nonferrous				
Aluminum ingot	27.10	27.10	27.10	24.40
Copper, electrolytic	34.00	34.00	36.00	43.00
Lead, St. Louis	15.80	15.80	15.80	15.80
Magnesium ingot	36.00	36.00	36.00	33.25
Nickel, electrolytic	74.00	74.00	74.00	64.50
Tin, Straits, N. Y.	103.00	102.50	101.00	99.50
Zinc, E. St. Louis	13.50	13.50	13.50	13.50

*Revised. *Reflects U. S. Steel increases.

Major Steel Price Increases

U. S. Steel takes lead in advancing extras and base prices . . . Other mills following suit . . . Changes involve wide range of products . . . Offset rising costs.

◆ STEEL USERS got more bad news this week. Major increases in extras and base prices affected a wide range of steel products. U. S. Steel Corp. took the lead.

Youngstown Sheet & Tube Co. and National Supply Co. followed U. S. Steel in making pipe and tubing base advances. Action by others was indicated.

Base price advances averaging 3½ pct, effective Feb. 9, were announced by National Tube Div. on seamless standard and linepipe, 2 in. to 12 in.; for all sizes of butt-weld pipe; oil country casing, tubing, and drill pipe; and carbon seamless mechanical and pressure tubing.

For seamless and electricweld linepipe, the increases averaged \$9 per ton. For butt-weld pipe, the boosts ranged from \$4.50 to \$6.50 per ton, depending on size.

Price extras were increased on carbon hot-rolled bars, concrete reinforcing bars, tube rounds, skelp, rerolling and forging semi-finished steel, rods, wire, and alloy products.

The extra changes amounted to an increase of nearly 4 pct on the basis of total selling price, including base price and extras.

Extras involved were size, chemistry, grade, quality, treatment, length, quantity, cutting, special straightness, and bundling. The entire list of extra changes did not apply to all products affected.

The latest series of increases on extras just about completes the upward trend that began in December when the mills took the first step toward offsetting rising raw material and production costs. Earlier increases involved extras on sheets and strip, plates, and structurals.

The IRON AGE Finished Steel Composite, reflecting butt-weld increases by U.S. Steel, **rose to 5.650c.**

SHEET AND STRIP . . . Lag in automotive market continues to influence sheet market adversely. And, right at the moment, there aren't many encouraging signs.

Feeling in **Detroit** market area is that while automotive demand may not get any better in the second quarter, it certainly shouldn't get worse. In any event, as orders for the April-June period begin to come in there, producers are keeping their fingers crossed.

Meanwhile customers in the **Chicago** area are slow committing themselves on sheet and strip in the second quarter. Warehouses in particular are transferring tonnage originally slated for the first quarter back into the second. Result is that demand in next 3-month period will be depressed by this delayed tonnage. Hot-rolled sheet is in better shape, but new orders are also slow coming in.

A large sheet producer in the **Philadelphia** area is offering customers more tonnage than normal for the coming quarter and hoping for the best.

Cold-rolled sheets are available for March rolling at one **Cleveland** mill, while another is sold out through April. Hot-rolled sheets are solidly booked.

PLATE AND STRUCTURALS . . . **Detroit** producer says its conversion plate is sold out for April and it won't be long before May's is gone. Waiting time for regular product is at least 18 months.

At **Pittsburgh** a number of mills are rolling light plate on strip mills. However, heavier sizes and structurals are as tight as ever. Same situation: good amount of light plate obtained via sheet and strip mills, little heavy product, exists at **Philadelphia**.

At **Chicago** the amount of strip mill plate which can be rolled in second quarter will depend on demand for strip in the area. If strip ordering doesn't pick up, the mills will provide more space for plate. This doesn't help market for wide width plate, however.

STAINLESS STEEL . . . Nickel continues as the problem in stainless. **Pittsburgh** producer reports orders are coming in more slowly than last year, but there has been no drop in shipments.

Cleveland mills are carrying heavier than normal semi-finished inventories. One reason: Customers are shopping around for quick delivery dates for alloys. Having semi-finished on hand often means the difference between getting and losing an order.

BARS . . . Demand for hot-rolled bar is brisk in **Chicago** area. Some mills have had to stretch out rolling cycles slightly to take care of all orders.

Market in the **Philadelphia** area, however, is easy except for the larger sizes, where there's a better balance between supply and demand.

At **Detroit** a slight pickup in merchant quality and forging bars is looked for, but not being predicted out loud.

WIRE PRODUCTS . . . Wire products at **Cleveland** are generally available on a few weeks delivery. That's for standard items. Some specialties are being rolled ahead of schedule. There's heavy demand for wire rope from heavy construction and road building fields.

WIRE MESH FACILITIES . . . Equipment for production of welded wire mesh is being installed at United States Steel's Tennessee Coal & Iron Div. at Fairfield, Ala. It includes two 156-in. fabric welding machines with a combined annual capacity of almost 18,000 tons.

Expected to be in operation by the third quarter, the facilities will provide fabric in various widths, in cut-to-length sheets or coils.

Purchasing Agent's Checklist

RESEARCH: New GE material is as hard as a diamond . . . p. 78

PRODUCTION: Reinforced plastics may answer some aircraft engineering problems . . . p. 82

MARKETING: What's in a company's trademark? . . . p. 83

TECHNICAL: When is an under-drive press a good buy? . . . p. 124

Comparison of Prices

(Effective Feb. 12, 1957)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Feb. 12 Feb. 5 Jan. 15 Feb. 14
1957 1957 1957 1956

Flat-Rolled Steel: (per pound)

Hot-rolled sheets	4.675¢	4.675¢	4.675¢	4.325¢
Cold-rolled sheets	5.75	5.75	5.75	5.325
Galvanized sheets (10 ga.)	6.30	6.30	6.30	5.85
Hot-rolled strip	4.675	4.675	4.675	4.325
Cold-rolled strip	6.870	6.870	6.870	6.25
Plate	4.87	4.87	4.87	4.52
Plates, wrought iron	10.40	10.40	10.40	10.40
Stain's C-R strip (No. 302)	50.00	50.00	50.00	44.50

Tin and Terneplate: (per base box)

Tinplate (1.50 lb.) cokes	\$9.95	\$9.95	\$9.95	\$9.05
Tin plates, electro (0.50 lb.)	8.65	8.65	8.65	7.75
Special coated mfg. terne	9.20	9.20	9.20	7.85

Bars and Shapes: (per pound)

Merchant bars	5.075¢	5.075¢	5.075¢	4.65¢
Cold finished bars	6.85	6.85	6.85	5.90
Alloy bars	6.125	6.125	6.125	5.65
Structural shapes	5.00	5.00	5.00	4.60
Stainless bars (No. 302)	43.25	43.25	43.25	38.25
Wrought iron bars	11.50	11.50	11.50	11.50

Wire: (per pound)

Bright wire	7.20¢	7.20¢	7.20¢	6.25¢
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Rails: (per 100 lb.)

Heavy rails	\$5.075	\$5.075	\$5.075	\$4.725
Light rails	6.00	6.00	6.00	5.65

Bemis Steel: (per net ton)

Rerolling billets	\$74.00	\$74.00	\$74.00	\$68.50
Slabs, rerolling	74.00	74.00	74.00	68.50
Forging billets	91.50	81.50	81.50	84.50
Alloy blooms, billets, slabs	107.00	107.00	107.00	96.00

Wire Rod and Skelp: (per pound)

Wire rods	5.80¢	5.80¢	5.80¢	5.025¢
Skelp	4.225	4.225	4.225	4.225

Finished Steel Composite: (per pound)

Base price	5.650¢	5.622¢	5.622¢	5.174¢
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Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Feb. 12 Feb. 5 Jan. 15 Feb. 14
1957 1957 1957 1956

Pig Iron: (per gross ton)

Foundry, Valley	\$66.88	\$66.88	\$66.88	\$63.69
Foundry, Southern Cinti	63.00	63.00	63.00	59.00
Foundry, Birmingham	67.17	67.17	67.17	62.93
Foundry, Chicago	59.00	59.00	59.00	55.00
Basic del'd Philadelphia	66.38	66.38	66.38	62.77
Basic Valley furnace	62.50	62.50	62.50	58.50
Malleable, Chicago	63.00	63.00	63.00	59.00
Malleable, Valley	63.00	63.00	63.00	59.00
Ferromanganese, cents per lb ¹	12.75¢	12.75¢	12.75¢	9.50¢
74 to 76 pct Mn base.				

Pig Iron Composite: (per gross ton)

Pig iron	\$62.90	\$62.90	\$62.90	\$59.09
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Scrap: (per gross ton)

No. 1 steel, Pittsburgh	\$53.50	\$54.50	\$61.50	\$49.50
No. 1 steel, Phila. area	57.50	57.50	58.50	51.50
No. 1 steel, Chicago	49.00	49.50	57.50	46.50
No. 1 bundles, Detroit	45.50	42.50	51.50	44.50
Low phosph., Youngstown	53.50	54.50	65.50	54.50
No. 1 mach'y cast, Pittsburgh	56.50	56.50	60.50	55.50
No. 1 mach'y cast, Philadel'a.	57.50	60.50	60.50	54.50
No. 1 mach'y cast, Chicago	50.50	51.50	55.50	51.50

Steel Scrap Composite: (per gross ton)

No. 1 heavy melting scrap	\$53.33	\$53.83	\$59.17	\$49.00
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Coke, Connellsville: (per net ton at oven)

Furnace coke, prompt	\$15.38	\$15.38	\$15.50	\$14.25
Foundry coke, prompt	\$17.50-\$19	\$17.50-\$19	\$18-19	\$16.25

Nonferrous Metals: (cents per pound to large buyers)

Copper, electrolytic, Conn.	34.00	34.00	36.00	43.00
Copper, Lake, Conn.	34.00	34.00	36.00	45.00
Tin, Straits, New York	103.00*	102.50	101.00	99.50
Zinc, East St. Louis	13.50	13.50	13.50	13.50
Lead, St. Louis	15.80	15.80	15.80	15.80
Aluminum, virgin, ingot	27.10	27.10	27.10	24.40
Nickel, electrolytic	74.00	74.00	64.00	64.00
Magnesium, ingot	36.00	36.00	36.00	33.25
Antimony, Laredo, Tex.	33.00	33.00	33.00	33.00

† Tentative. * Average. * Revised.

Steel Scrap Composite

Averages of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

STAINLESS STEEL

← To identify producers, see Key on P. 188 →

Base price cents per lb f.o.b. mill

Producing Point	Basic	Fdry.	Mall.	Bass.	Law Phes.	Product	201	202	301	302	303	304	318	321	347	403	410	416	438
Birdsboro, Pa. B6	64.50	65.00	65.50	66.00		Ingots, reroll.	21.25	22.75	22.25	24.25	—	26.00	38.25	31.00	35.50	—	16.00	27.75	16.25
Birmingham R3	58.50	59.00*				Slabs, billets	26.00	29.00	27.00	30.25	30.75	32.00	47.50	38.50	44.75	—	20.75	—	21.00
Birmingham W9	58.50	59.00*	63.00			Billets, forging	—	35.00	35.75	36.50	39.50	39.00	59.75	45.25	53.50	30.75	27.25	27.75	27.75
Birmingham U4	58.50	59.00*	63.00			Bars, struct.	—	41.25	42.50	43.25	46.25	46.00	70.25	53.25	62.25	38.25	32.50	33.00	33.00
Buffalo R3	62.50	63.00	63.50	64.00		Plates	—	43.25	44.50	45.50	48.00	48.75	73.75	57.50	67.00	38.75	33.75	35.50	34.50
Buffalo HI	62.50	63.00	63.50	64.00		Sheets	46.75	47.25	49.25	50.00	—	53.25	78.25	63.00	76.25	46.50	38.75	46.50	39.25
Chester P2	64.50	65.00	65.50			Strip, hot-rolled	34.50	37.50	35.75	39.00	—	42.50	66.50	51.50	61.00	—	29.75	—	30.75
Chicago 14	62.50	63.00	63.50			Strip, cold-rolled	43.25	47.25	45.75	50.00	—	53.25	78.25	63.00	76.25	46.50	38.75	46.50	39.25
Cleveland A5	62.50	63.00	63.50	64.00		Wire CF; Red HR	—	39.25	40.25	41.00	44.00	43.75	66.75	58.50	59.25	34.50	31.00	31.50	31.50
Cleveland R3	62.50	63.00	63.50	64.00			40.50	41.25				67.00	51.00	59.50					
Duluth 14	62.50	63.00	63.50	64.00															
Erie 14	62.50	63.00	63.50	64.00															
Everett M6	65.00																		
Fenton K1	70.50	71.00																	
Genesee, Utah C7	62.50	63.00																	
Granite City G2	64.40	64.90	65.40																
Minnequa C6	64.50	65.00	65.50																
Monessen P6	62.50																		
Neville Is. P4	62.50	63.00	63.50	64.00															
N. Tonawanda T1	63.00	63.50	64.00																
Pittsburgh U1	62.50	63.00	63.50																
Sharpsville S1	62.50	63.00	63.50																
So. Chicago R3	62.50	63.00	63.50																
Swedenland A2	64.50	65.00	65.50	66.50															
Teleda 14	62.50	63.00	63.50	64.00															
Troy, N. Y. R3	64.50	65.00	65.50	66.00	70.50														

DIFFERENTIALS: Add, 50¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct) 50¢ per ton for each 0.50 pct manganese or portion thereof over 1 pct, \$2 per ton for 0.5 to 0.75 pct nickel, \$1 for each additional 0.25 pct nickel.

* Add \$1.00 for 0.31-0.69 pct phosph. † Intermediate low phosph.

‡ Add \$1.00 for 0.31-0.50 pct phosph

Pressure Mounts On Export

Commerce Dept. wants less heavy melting scrap going overseas . . . Weeks wants Allies to be more self sufficient on metallics . . . Downtrend of domestic market continues.

◆ COMMERCE SECRETARY Sinclair Weeks would like to see less heavy melting scrap going into export. He also would like to have our European allies become more self-sufficient in metallics.

Secretary Weeks may spell out his position in a letter this week to Representative Spence, chairman of the House Banking & Currency Committee. It would be a follow-up to the Commerce Dept.'s report of last week based on a Battelle survey of obsolete heavy melting scrap supply and availability.

The Commerce secretary is expected to recommend that foreign buyers of U. S. scrap be contacted and asked to place less reliance on obsolete heavy melting scrap this year, and to make strong efforts to scale down total requirements.

A major point in Secretary Weeks' thinking is that our Allies should be more self-contained on metallics by 1958.

It's not likely that the government is contemplating definite export controls. But it is certain that exports will be closely observed in '57 for purposes of revising the government's general policy on scrap shipments overseas.

Some sources believe that the Commerce Dept., without saying as much, may want to get across the message that if more judgment is not used in the placing of orders, more stringent measures may be necessary.

The general downturn of the market continues, with small to moderate declines in most markets. However, there are some signs of a leveling market. Detroit, for example, took a \$3 upward jump on the basis of a major purchase.

Elsewhere, some mill offers of

several dollars below the market level failed to bring in scrap. In other markets, broker buying was again higher than official mill prices in some instances.

The East Coast market hinged on the possibility of a Longshoremen's strike. The market has been pegged by strong export. A sudden drop would undoubtedly follow a strike of any duration. Eastern markets have not been affected by the general decline to the same extent as inland, principally because of overseas demand.

Pittsburgh . . . A major mill has purchased openhearth scrap at \$54 for No. 1 heavy melting, \$48 for No. 2 heavy melting, and \$46 for No. 2 bundles. This represents a drop of \$1 for the first two and no change for No. 2 bundles. No. 1 factory bundles dropped in sympathy with dealer grades. Low phos is off \$1 on scattered buying. The newest openhearth buy, for a relatively small tonnage, is the fourth mill order in a period of two weeks. The volume of scrap ordered points to a leveling off of the market near current prices.

Chicago . . . In a relatively dull market, prices slipped at the mill level. However, material continues to move on old prices. For example, while new mill sales of No. 2 heavy melting at as low as \$43 brought in some material, broker buying at \$46 was reported. On No. 1 heavy melting, a mill price of \$50 was balanced against broker buying at \$53. There is some feeling that the market is leveling.

Philadelphia . . . Cast grades dropped \$3 down the line based on two large mill purchases. A buy of low phos 2 ft and under at \$64 sent that grade down \$1. Other grades held steady, thanks to export activity. However, possibility of a dock strike this week means that a general price break may be in the cards.

New York . . . Prices are off about \$1 per ton virtually across the board on the basis of recent sales to consumers in adjacent districts. But the market is quiet, and brokers and dealers feel this is an inevitable price shakeout. Many feel the real test will come at the end of March.

Detroit . . . Prices advanced surprisingly on the basis of a local order for No. 1 heavy melting on a \$46 FOB basis. The same mill also purchased No. 2 bundles at an FOB price of \$35.50.

Cleveland . . . The market declined another \$1 on lower broker buying, and a lack of new orders. Major tonnage moving is in auto lists going at only a nominal mark-up over dealer grades. Valley mills are staying out of the market.

Birmingham . . . Although the largest buyer of heavy melting continues out of the market, an Atlanta mill returned to the market this week, buying No. 2 heavy melting only on the basis of \$44 delivered. This was \$4 under the last purchase.

St. Louis . . . The market is generally unchanged. One consumer reduced its offering prices \$2.50 on No. 1 heavy melting and \$1 on No. 2, but it is understood that no sales were made on that basis.

Cincinnati . . . Prices dropped another \$1 as a local mill came into the market for medium tonnage. No. 1 heavy melting brought \$52 delivered; No. 2 heavy melting \$45; and No. 2 bundles \$40. The tonnage was easily covered in the local market.

Buffalo . . . A general lack of activity characterizes this market. Railroad steel wheels, railroad spring steel, and railroad couplers and knuckles are all off in sympathy with other areas. A sale of cupola cast is expected this week at slightly lower prices. Scrap is flowing spasmodically into dealer yards. Recent good weather has helped.

Boston . . . Secondary grades dropped a little in a very quiet market. Prices of No. 2 heavy melting and No. 2 bundles went down 50¢. Electric furnace bundles and chemical borings dropped \$1. Export activity is negligible.

West Coast . . . Flow of scrap in all Coast areas is good. Prices remain unchanged. They are firm in San Francisco, but soft in Los Angeles. Exporting continues very active.

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for complete
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STAINLESS STEEL SCRAP NICKEL-CHROME SCRAP



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MODENA, PENNA. PITTSBURGH, PENNA.
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Scrap Prices (Effective Feb. 12, 1957)

Pittsburgh

No. 1 hvy. melting	\$53.00 to \$54.00
No. 2 hvy. melting	47.00 to 48.00
No. 1 dealer bundles	53.00 to 54.00
No. 1 factory bundles	56.00 to 57.00
No. 2 bundles	45.00 to 46.00
Machin. shop turn.	39.00 to 40.00
Mixed bor. and ms. turn.	39.00 to 40.00
Shoveling turnings	43.00 to 44.00
Cast iron borings	43.00 to 44.00
Low phos. punch'gs plate	57.00 to 58.00
Heavy turnings	48.00 to 49.00
No. 1 RR hvy. melting	56.00 to 57.00
Scrap rails, random lgth.	68.00 to 69.00
Rails 2 ft and under	71.00 to 72.00
RR steel wheels	68.00 to 69.00
RR spring steel	68.00 to 69.00
RR couplers and knuckles	68.00 to 69.00
No. 1 machinery cast.	56.00 to 57.00
Cupola cast.	50.00 to 51.00
Heavy breakable cast.	48.00 to 49.00

Chicago

No. 1 hvy. melting	\$48.00 to \$50.00
No. 2 hvy. melting	43.00 to 45.00
No. 1 dealer bundles	49.00 to 50.00
No. 1 factory bundles	53.00 to 54.00
No. 2 bundles	39.00 to 40.00
Machin. shop turn.	33.00 to 34.00
Mixed bor. and turn.	35.00 to 36.00
Shoveling turnings	35.00 to 36.00
Cast iron borings	35.00 to 36.00
Low phos. forge crops	61.00 to 62.00
Low phos. punch'gs plate	57.00 to 58.00
Low phos. 5 ft and under	56.00 to 57.00
No. 1 RR. hvy. melting	54.00 to 56.00
Scrap rails, random lgth.	66.00 to 67.00
Rerolling rails	65.00 to 68.00
Rails 2 ft and under	70.00 to 71.00
Locomotive tires cut	58.00 to 59.00
Cut bolsters & side frames	58.00 to 59.00
Angles and splice bars	63.00 to 64.00
RR. steel car axles	77.00 to 79.00
RR. couplers and knuckles	57.00 to 58.00
No. 1 machinery cast.	50.00 to 51.00
Cupola cast.	44.00 to 45.00
Heavy breakable cast.	43.00 to 44.00
Cast iron brake shoe	42.00 to 43.00
Cast iron wheels	52.00 to 53.00
Malleable	64.00 to 65.00
Stove plate	43.00 to 44.00
Steel car wheels	57.00 to 58.00

Philadelphia Area

No. 1 hvy. melting	\$57.00 to \$58.00
No. 2 hvy. melting	49.00 to 50.00
No. 1 dealer bundles	57.00 to 58.00
No. 2 bundles	47.50 to 48.50
Machin. shop turn.	41.00 to 42.00
Mixed bor. short turn.	43.00 to 44.00
Cast iron borings	43.00 to 44.00
Shoveling turnings	45.00 to 46.00
Clean cast chem. borings	49.00 to 50.00
Low phos. 5 ft and under	62.00 to 63.00
Low phos. 2 ft and under	63.00 to 64.00
Low phos. punch'gs	64.00 to 65.00
Elec. furnace bundles	60.00 to 61.00
Heavy turnings	53.00 to 54.00
RR. steel wheels	71.00 to 72.00
RR. spring steel	71.00 to 72.00
Rails 18 in. and under	75.00 to 77.00
Cupola cast.	52.00 to 53.00
Heavy breakable cast.	55.00 to 56.00
Cast iron car wheels	61.00 to 62.00
Malleable	66.00 to 67.00
Unstripped motor blocks	41.00 to 42.00
No. 1 machinery cast.	57.00 to 58.00

Cleveland

No. 1 hvy. melting	\$50.00 to \$51.00
No. 2 hvy. melting	44.00 to 45.00
No. 1 dealer bundles	50.00 to 51.00
No. 1 factory bundles	51.00 to 52.00
No. 2 bundles	38.00 to 39.00
No. 1 busheling	50.00 to 51.00
Machin. shop turn.	32.00 to 33.00
Mixed bor. and turn.	35.00 to 36.00
Shoveling turnings	35.00 to 36.00
Cast iron borings	35.00 to 36.00
Cut struct'r. & plates, 2 ft & under	57.00 to 58.00
Drop forge flashings	50.00 to 51.00
Low phos. punch'gs. plate	51.00 to 52.00
Foundry steel, 2 ft & under	53.00 to 54.00
No. 1 RR. heavy melting	56.00 to 57.00
Rails 2 ft and under	73.00 to 74.00
Rails 18 in. and under	74.00 to 75.00
Railroad grade bars	39.00 to 40.00
Steel axle turnings	37.00 to 38.00
Railroad cast.	54.00 to 55.00
No. 1 machinery cast.	54.00 to 55.00
Stove plate	51.00 to 52.00
Malleable	61.00 to 62.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting	\$52.00 to \$53.00
No. 2 hvy. melting	47.00 to 48.00
No. 1 dealer bundles	52.00 to 53.00
No. 2 bundles	43.00 to 44.00
Machin. shop turn.	31.00 to 32.00
Shoveling turnings	37.00 to 38.00
Cast iron borings	36.00 to 37.00
Low phos. plate	53.00 to 54.00

Buffalo

No. 1 hvy. melting	\$53.00 to \$54.00
No. 2 hvy. melting	46.00 to 47.00
No. 1 busheling	53.00 to 54.00
No. 1 dealer bundles	53.00 to 54.00
No. 2 bundles	42.00 to 43.00
Machin. shop turn.	31.00 to 32.00
Mixed bor. and turn.	31.00 to 32.00
Shoveling turnings	34.00 to 35.00
Cast iron borings	32.00 to 33.00
Low phos. plate	58.00 to 59.00
Scrap rails, random lgth.	63.00 to 64.00
Rails 2 ft and under	67.00 to 68.00
RR. steel wheels	58.00 to 59.00
RR. spring steel	58.00 to 59.00
RR. couplers and knuckles	58.00 to 59.00
No. 1 machinery cast.	49.00 to 50.00
No. 1 cupola cast.	48.00 to 49.00

Detroit

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$45.00 to \$46.00
No. 2 hvy. melting	41.50 to 42.50
No. 1 dealer bundles	48.50 to 49.50
No. 2 bundles	36.50 to 37.50
Machin. shop turn.	34.00 to 35.00
Mixed bor. and turn.	33.50 to 34.50
Shoveling turnings	37.00 to 38.00
Cast iron borings	33.50 to 34.50
Low phos. 18 in. & under	55.00 to 56.00
Rails, random lengths	63.00 to 64.00
Rails, 18 in. and under	73.00 to 74.00
No. 1 cupola cast.	46.00 to 47.00
Heavy breakable cast.	46.00 to 47.00
Drop broken cast.	55.00 to 56.00

St. Louis

No. 1 hvy. melting	\$48.00 to \$49.00
No. 2 hvy. melting	44.00 to 45.00
No. 1 dealer bundles	48.00 to 49.00
No. 2 bundles	39.00 to 40.00
Machin. shop turn.	33.00 to 34.00
Cast iron borings	35.00 to 36.00
Drop forge flashings	44.50 to 45.50
Machin. shop turn.	28.00 to 29.00
Mixed bor. and turn.	31.00 to 32.00
Shoveling turnings	31.00 to 32.00
Low phos. punch'gs. plate	45.00 to 46.00
No. 1 cupola cast.	51.00 to 52.00
Heavy breakable cast.	44.00 to 45.00
Stove plate	45.00 to 46.00
Automotive cast.	54.00 to 55.00

Boston

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$37.00 to \$48.00
No. 2 hvy. melting	44.00 to 45.00
No. 1 dealer bundles	48.00 to 49.00
No. 2 bundles	39.00 to 40.00
Machin. shop turn.	33.00 to 34.00
Cast iron borings	35.00 to 36.00
Shoveling turnings	35.00 to 36.00
No. 1 RR. hvy. melting	54.00 to 55.00
Rails, random lengths	63.00 to 64.00
Rails 18 in. and under	74.00 to 75.00
Locomotive tires cut.	54.00 to 55.00
Angles and splice bars	58.00 to 59.00
Std. steel car axles	73.00 to 74.00
RR. specialties	58.00 to 59.00
Cupola cast.	44.00 to 45.00
Heavy breakable cast.	40.00 to 41.00
Cast iron brake shoes	49.00 to 50.00
Stove plate	42.00 to 43.00
Cast iron car wheels	50.00 to 51.00
Rerolling rails	65.00 to 66.00
Unstripped motor blocks	40.00 to 41.00

New York

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$51.00 to \$52.00
No. 2 hvy. melting	43.00 to 44.00
No. 1 dealer bundles	40.00 to 41.00
No. 2 bundles	34.00 to 35.00
Machin. shop turn.	32.00 to 33.00
Mixed bor. and turn.	35.00 to 36.00
Shoveling turnings	36.00 to 37.00
Clean cast chem. borings	33.00 to 34.00
No. 1 machinery cast.	49.00 to 50.00
Mixed yard cast.	45.00 to 46.00
Charging box cast.	46.00 to 47.00
Heavy breakable cast.	48.00 to 50.00
Unstripped motor blocks	37.00 to 38.00

Birmingham

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$44.00 to \$45.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 dealer bundles	44.00 to 45.00
No. 2 bundles	31.00 to 32.00
No. 1 busheling	44.00 to 45.00
Machin. shop turn.	34.00 to 35.00
Shoveling turnings	35.00 to 36.00
Cast iron borings	37.00 to 38.00
Low phos. 18 in. and under	55.00 to 56.00
Rails, 18 in. and under	65.00 to 67.00
No. 1 cupola cast.	60.00 to 61.00
Rerolling rails	65.00 to 66.00
Electric furnace, 2 ft & under	50.00 to 51.00
Bar crops and plate	55.00 to 56.00
Structural and plate, 2 ft	54.00 to 55.00
No. 1 RR. hvy. melting	50.00 to 51.00
Scrap rails, random lgth.	61.00 to 62.00
Rails, 18 in. and under	66.00 to 67.00
Angles and splice bars	65.00 to 66.00
Rerolling rails	65.00 to 66.00
No. 1 cupola cast	53.00 to 54.00
Stove plate	51.00 to 52.00
Charging box cast	40.00 to 41.00
Cast iron car wheels	42.00 to 43.00
Unstripped motor blocks	42.00 to 43.00
Mashed tin cans	15.00 to 16.00
Elec. furnace, 2 ft & under	48.00 to 49.00

Cincinnati

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$48.50 to \$49.50
No. 2 hvy. melting	41.50 to 42.50
No. 1 dealer bundles	48.50 to 49.50
No. 2 bundles	36.50 to 37.50
Machin. shop turn.	34.00 to 35.00
Mixed bor. and turn.	33.50 to 34.50
Shoveling turnings	37.00 to 38.00
Cast iron borings	33.50 to 34.50
Low phos. 18 in. & under	55.00 to 56.00
Rails, 18 in. and under	63.00 to 64.00
No. 1 cupola cast.	46.00 to 47.00
Heavy breakable cast.	46.00 to 47.00
Drop broken cast.	55.00 to 56.00

San Francisco

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$55.00
No. 2 hvy. melting	50.00
No. 1 dealer bundles	54.00
No. 2 bundles	38.00
Machin. shop turn.	35.00
Cast iron borings	35.00
No. 1 RR. hvy. melting	55.00
No. 1 cupola cast.	60.00

Los Angeles

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$55.00
No. 2 hvy. melting	51.00
No. 1 dealer bundles	54.00
No. 2 bundles	36.00
Machin. shop turn.	34.00
Shoveling turnings	37.00
Cast iron borings	34.00
Drop forge. (foundry)	34.00
No. 1 RR. hvy. melting	55.00
No. 1 cupola cast.	57.00

Seattle

Brokers buying prices per gross ton, on cars:</td



*for higher
performance it's*

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Size for size, Ohio Magnets lift larger loads over longer periods because they *operate cooler*. So for extra magnet lifting power, extra magnet value—always specify Ohio Magnets and Ohio Magnet Controllers. There's a type and size for every lifting job. Send for free copy of Bulletin 112, or consult the Yellow Pages for Ohio offices in principal cities.

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February 14, 1957

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Nickel Draws More Producers

Extensive Cuban reserves will draw several new firms into nickel producing field . . . Government reports are equal in content to Canada . . . Freeport has big plans.

SEVERAL COMPANIES are poised to enter the nickel-producing field. At least one has plans that would put it on a par with International Nickel Co. In 1957 Inco will supply about 65 pct of free world nickel.

Freeport Sulphur Co., N. Y., wants to launch a big operation at Moa Bay, Cuba. Bethlehem Steel Co. intends to get into the nickel business, but has not announced definite plans. Washington observers say the government is about to sell its Nicaro, Cuba, plant to the highest bidder.

Freeport Sulphur will probably be International Nickel's first serious competitor. It has filed requests with the government for a fast tax write-off, and a purchase contract. A spokesman said his company would begin operations $2\frac{1}{2}$ years after the government acts.

Size of the initial installation depends on how much of a write-off the company can get. How much nickel the government will take, is also a factor. The company would like to move in a big way, says it won't consider less than a 30 million lb starter.

Freeport figures it has four big reasons for going into the nickel business: (1) Demand is far in excess of production. (2) It has experience. It built Nicaro and ran the operation for several years. (3) It owns huge ore reserves in Cuba. (4) By-products are profitable.

The big reason for the shifting nickel production picture is the Cuban ore reserves.

President Eisenhower's Materials Policy Commission reported, in 1952, that Cuban reserves totaled 25 million tons of contained nickel. Canadian reserves were pegged at 4 million.

The U. S. Bureau of Mines and the Geological Survey estimate reserves, in tons of contained nickel as: Cuba, 24,400,000, Canada, 4,470,000. There have been subsequent ore discoveries in Canada.

Freeport believes the reserve situation makes it a matter of time before it can compete with Inco. The company doesn't expect it to happen overnight. Nickel price will have a lot to do with the timetable.

Most vital by-product is cobalt. Cobalt output at Moa Bay will be about 10 pct of nickel output. Current price is over \$2.00 per lb. Freeport expects this to go a long way in paying operating costs.

Bethlehem Steel would also operate in Cuba. The company is known to have extensive holdings there.

Prominently mentioned for purchase of Nicaro is National Lead Co. Primary reason is the com-

pany owns 76 pct of Nickel Processing Corp., which now operates Nicaro for the government. It is probable no action will be taken to sell the installation for at least several years. Herman B. Director Associates, a Washington market research and analysis firm, says national nickel stockpile is only half full. All Nicaro output goes to the stockpile.

ALUMINUM . . . Because of a water shortage, Aluminium Ltd. may have to shut down a series of potlines.

But the shortage at the Arvida works is only seasonal and neither unusual nor serious.

The problem: January was unusually cold. Twenty-five days were below zero, against an average of eight. Water in the mountains is still frozen. If it doesn't thaw by the end of February, Aluminium Ltd. will have to shut down as many as eight potlines. Maximum loss in output would be 15,000 tons, or about 2 pct of annual capacity.

However, the water potential is there. It is likely that any loss of output will be made up in the spring when water flow reaches its peak.

Aluminium Ltd. reports that all potlines have been operating in excess of rated capacity for some time. Any downtime will be used for much-needed maintenance.

E. M. Strauss, Jr., manager of commercial research, Aluminum Co. of America, is optimistic about continued growth of aluminum markets. His opinion: consumption in 1957 will be up 8 pct over 1956. By 1960 primary capacity in the U. S. will top 2.5 million tons. This would be about 40 pct over 1956.

COPPER . . . Sir Ronald Prain, chairman of the Rhodesian Selection Trust, major African copper producer, says copper production costs in Rhodesia are higher than in the U. S.

U. S. producers make no direct comment. But it is widely known they consider low-cost African copper one of the factors which pulled their price down.

Some observers say the difference of opinion may stem from the fact that Mr. Prain uses a weighted average in his calculations.

Said the RST chairman, ". . . the costs of producing copper in Rhodesia on a weighted average basis were about one cent per pound higher than the weighted average cost of the U. S."

Market analysts believe Mr. Prain

Primary Prices

(cents per lb)	Current price	last price	date of change
Aluminum ingot	27.10	25.90	8/10/56
Aluminum pig	25.00	24.00	8/10/56
Copper (E)	34.00	38.00	2/1/57
Copper (CS)	33.00	34.00	2/11/57
Copper (L)	34.00	38.00	2/2/57
Lead, St. L.	15.80	16.30	1/13/56
Lead, N. Y.	16.00	16.50	1/13/56
Magnesium ingot	38.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	74.00	64.50	12/6/56
Titanium sponge	250-275	270-300	12/4/56
Zinc, E. St. L.	13.80	13.00	1/6/56
Zinc, N. Y.	14.90	13.50	1/6/56

ALUMINUM: 99% ingot frt allwd. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig. VELASCO, TEX. NICKEL: Port Colbourne, Canada. ZINC: prime western. TIN: see column at right, other primary prices, pg. 184.

based his statement on the wide difference between high and low cost U. S. operations. Some believe the spread is as much as 10¢ per lb. They say Mr. Prain underweighted the 1956 high cost shaft mine output.

These observers say on a median basis U. S. costs are higher.

It is generally accepted, however, that no matter what the current situation is, the trend favors Rhodesia. The big factor is power. More cheap hydroelectric sources are available to all the African installations. Until just last year a number of operations had to burn wood for power.

TIN . . . Market observers say Bolivia, highest cost tin producer, will move for a boost in the price at which the manager of the International Tin Agreement buffer stock can sell tin on the world market. (See P. 83.)

Buffer stock metal (when there is any) is to be bought and sold to keep world price within an equitable range. Bolivia's move would push this range up.

The tin industry is betting Bolivia won't get the boost.

Votes are equally divided between producers and consumers. World's biggest producer, Malaya, with the biggest voting block, will oppose the change. Malaya has said it is satisfied with the present range, between 90¢ and \$1.00 per lb.

Major U. S. tin brokers say current provisions are equitable. All agree that the consuming countries will vote unanimously against a change.

One broker goes even further. He says the possibility of a dock strike has driven small consumers into the market, accenting the slight spot shortage. He expects the price to fall, barring trouble, within a month. This would further weaken Bolivia's case.

The Malayan Tin Bureau predicts the following supply-demand situation for 1957:

Supply—Four of the six major tin producers—Malaya, Belgian Congo, Thailand, Nigeria—seem likely to maintain or increase output

Demand—Five of the eight major tin consumers: U. S., West Germany, Japan, India, Canada, seem likely to maintain or increase their intake in 1957. U. S. industry activity is expected to continue at a high level. Production increases for automobiles and trucks, chemicals, containers, electronic apparatus and machinery indicate larger tin consumption.

Tin prices for the week: Feb. 6—102.25; Feb. 7—102.75; Feb. 8—103.50; Feb. 11—102.75; Feb. 12—103.00.*

*Estimate.

TRADE-MARKS WHICH IDENTIFY THE ORIGINAL AND THE BEST

"PHOSPHOR BRONZE."



Phosphor Bronze®

ELEPHANT BRAND®

A little more than seventy-five years ago a wonderful new kind of copper and tin alloy possessing high tensile strength, great resiliency and unusual corrosion-resistant properties was introduced to American industry. This new bronze alloy had been perfected by the addition of a small amount of phosphorus to the copper and tin mixture.

No other producer of metals in the United States was able to duplicate this extraordinarily useful alloy. Therefore, because of the uniqueness of this new phosphorus-bearing alloy, the smelters responsible for its creation gave it a trade name "PHOSPHOR BRONZE" and adopted for itself the firm name of The Phosphor Bronze Smelting Company.

This was the first Phosphor Bronze ever produced in the United States of America.

"Phosphor Bronze" was immediately accepted by America's burgeoning industry. Demand for the new alloy grew by leaps and bounds and The Phosphor Bronze Smelting Company soon had many imitations of its products. So, to protect customers from spurious imitations, the trade name of "Phosphor Bronze" was incorporated into two distinctive trade-marks which were duly registered in the U. S. Patent Office on February 21, 1888. These trade-mark registrations have been maintained,

in full force, throughout the intervening years and are presently owned by The Phosphor Bronze Corporation, successors to the original Phosphor Bronze Smelting Company.

In time, new variations of the original "Phosphor Bronze" alloy were introduced by the now-famous smelting Company. To identify these, the trade name of "ELEPHANT BRAND" was adopted, together with a distinctive picture of an elephant. The words "ELEPHANT BRAND" were incorporated into a trade-mark and registered with the U. S. Patent Office on August 20, 1907. The picture of the elephant shown in this advertisement, is a new one, designed to supersede its 1906 predecessor and was Registered, as a trade-mark, on October 2, 1956.

We are proud that American industry has wholeheartedly accepted our product. The name "PHOSPHOR BRONZE" has become internationally known and is familiar to metalworking men and metallurgists everywhere.

In view of this unanimous acceptance and usage, we—the officers, stockholders and employees of The Phosphor Bronze Corporation acknowledge the universal use of the name and herewith bequeath it to the American metalworking industries. We reserve only . . . the exclusive right to use the trade-marks illustrated above.

THE PHOSPHOR BRONZE CORPORATION

A Wholly Owned and Operated Subsidiary of The Seymour Manufacturing Company

SEYMOUR, CONNECTICUT

Nonferrous Prices (Effective Feb. 12, 1957)

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate ("F" temper except 6061-0)				
Alloy	Factor	136- .032	249- .081	250- 3
1800, 1100, 3003.....	44.3	42.1	40.9	40.2
5052.....	51.8	46.8	45.1	42.9
6061-0.....	48.9	44.6	42.8	42.6

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6-8.....	45.5-47.3	61.3-65.1
12-14.....	46.2-47.7	62.2-66.8
24-26.....	49.4-49.5	73.1-77.8
36-38.....	58.3-59.0	97.4-101.0

Screw Machine Stock—2011-T-3

Size*	1/4	3/8-5/8	5/8-1	1 1/4-1 1/2
Price.....	59.7	58.8	57.4	55.2

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length*	72	96	120	144
.010 gage.....	\$1.352	\$1.803	\$2.254	\$2.704
.024 gage.....	1.686	2.252	2.815	3.378

MAGNESIUM

(F.o.b. shipping Pt., carload frt. allowed)

Sheet and Plate					
Type	Gage	250- 3.00	250- 2.00	188	.081
AZ31B Stand, Grade		67.9	69.0	77.9	103.1
AZ31B Spec.		93.3	95.7	108.7	171.3
Tread Plate		70.6	71.7		
Tooling Plate		73.0			

Extruded Shapes

Factor*	6-8	12-14	24-26	36-38
Comm. Grade (AZ31C)	69.6	70.7	75.6	89.2
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingots

AZ91B (Die Casting)..... 37.25 (delivered)

AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

"A" Nickel	Monel	Inconel	
Sheet, CR.....	113	97	118
Strip, CR.....	111	99	128
Rod, bar, HR.....	94	80	99
Angles, HR.....	94	80	99
Plates, HR.....	107	96	111
Seamless tube.....	144	120	190
Shot, blocks.....	78		

COPPER, BRASS, BRONZE

(Freight included on 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	56.13		53.36	56.32
Brass, 70/30	48.85	49.39	48.79	51.76
Brass, Low	51.80	52.34	51.74	54.91
Brass, R.L.	52.84	53.38	52.78	55.65
Brass, Naval	52.92		47.23	56.33
Muntz Metal	50.99		46.80	
Comm. Bz.	54.43	54.97	54.37	56.99
Mang. Bz.	56.66		50.76	
Phos. Bz. 5%	73.22		75.72	

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, \$11.00-
\$12.10; alloy, \$14.75; Plate, HR, commercially
pure, \$9.25-9.75; alloy, \$11.26. Wire, rolled
and/or drawn, commercially pure, \$8.50-\$9.00;
alloy, \$11.00; Bar, HR or forged, commercially
pure, \$7.10-\$7.86; alloy, \$7.10-\$7.30; billets, HR,
commercially pure, \$6.85-\$7.10; alloy, \$6.85-
\$7.06.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Antimony, American, Laredo, Tex. 33.50
Beryllium aluminum 5% Be, Dollar
per lb contained Be..... \$74.75
Beryllium copper, per lb cont'd \$43.00
Beryllium 97% lump or beads,
f.o.b. Cleveland, Reading..... \$71.50
Bismuth, ton lots..... \$2.25
Cadmium, d/pd..... \$1.70
Calcium, 99.9%, small lots..... \$4.55
Chromium, 30.5% metallic basis..... \$1.31
Cobalt, 97.39% (per lb)..... \$2.00 to \$2.97
Germanium, per gm, f.o.b. Miami
Oklahoma..... \$14.50-\$15.50
Gold, U. S. Treas., per troy oz..... \$35.00
Indium, 99.9% dollars per troy oz..... \$2.25
Iridium, dollars per troy oz..... \$90 to \$100
Lithium, 98%..... \$11.00 to \$14.00
Magnesium, sticks, 100 to 500 lb..... 59.00
Mercury, dollars per 76-lb flask,
f.o.b. New York..... \$255 to \$257
Nickel oxide sinter at Copper
Clif, Ont., contained nickel..... 71.25
Palladium, dollars per troy oz..... \$23 to \$24
Platinum, dollars per troy oz. 98 to \$101
Rhodium..... \$120.00 to \$125.00
Silver ingots (¢ per troy oz.)..... \$1.375
Thorium, per kg..... \$43.00
Uranium, normal per kg..... \$40.00
Vanadium..... \$3.45
Zirconium sponge..... \$10.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot			
No. 113			32.50
No. 120			31.00
No. 123			29.50
80-10-10 ingot			
No. 305			36.50
No. 315			34.50
88-10-2 ingot			44.75
No. 210			41.50
No. 215			37.00
No. 245			25.75
Yellow Ingot			29.00
No. 405			25.75
Manganese bronze			
No. 421			29.00

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys

0.30 copper max..... 24.50-25.50
0.60 copper max..... 24.25-25.25
Piston alloys (No. 122 type)..... 23.75-24.75
No. 12 alum. (No. 2 grade)..... 22.00-23.00
10% alloy..... 22.00-23.00
19% alloy..... 24.00-25.75
13 alloy (0.60 copper max.)..... 24.25-25.25
ANS-679..... 22.00-23.00

Steel deoxidizing aluminum, notch bar

granulated or shot

Grade	1-95-97%	22.75-23.75
Grade 2	92-95%	21.25-22.00
Grade 3	90-92%	20.50-21.50
Grade 4	85-90%	19.75-20.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for
shipments of 20,000 lb and over)

Heavy	Turnings
Copper	30
Yellow brass	23 1/4
Red brass	26 1/4
Comm. bronze	27 1/4
Mang. bronze	21 1/4
Yellow brass rod ends	23

Customs Smelters Scrap

(Cents per pound carload lots, delivered
to refinery)

No. 1 copper wire	26 1/2
No. 2 copper wire	25
Light copper	22 1/2
No. 1 composition	21 1/2
Hvy. yellow brass solids	17
Brass pipe	18
Radiators	17 1/2

Ingots Makers Scrap

(Cents per pound carload lots, delivered
to refinery)

No. 1 copper wire	26 1/2
No. 2 copper wire	25
Light copper	22 1/2
No. 1 composition	21 1/2
Hvy. yellow brass solids	17
Brass pipe	18
Radiators	17 1/2

Aluminum

Mixed old cast	15
Mixed new clips	15 1/2-16 1/2
Mixed turnings, dry	14-15

Dealer's Scrap

(Dealers' buying price f.o.b. New York
in cents per pound)

Copper and Brass

No. 1 copper wire	23 1/2-24
No. 2 copper wire	22-22 1/2
Light copper	20-20 1/2
No. 1 composition	19 1/2-20 1/2
No. 1 composition turnings	20-20 1/2

Brass

Old sheet	14 1/2-15
Old sheet and utensils	14-14 1/2
Old turnings	6 1/2-7
Industrial castings	10-10 1/2
2024 (24S) clippings	11 1/2-12

Zinc

New zinc clippings	6 1/2-7
Old zinc	4 1/2-5
Zinc routings	2 1/2-2 1/2
Old die cast scrap	2 1/2-2 1/2

Nickel and Monel

Pure nickel clippings	\$1.75-\$1.85
Clean nickel turnings	\$1.50-\$1.60
Nickel anodes	\$1.75-\$1.85
Nickel rod ends	\$1.75-\$1.85
New Monel clippings	80-85
Clean Monel turnings	75
Old sheet Monel	75-80

Nickel silver clippings, mixed	21
Nickel silver turnings, mixed	18

Lead

Soft scrap lead	12 1/2-13
Battery plates (dry)	6 1/2-7
Batteries, acid free	4-4 1/2

Miscellaneous

Block tin	77-78
No. 1 pewter	61-62
Auto babbitt	40-41

IRON AGE STEEL PRICES <i>(Effective Feb. 12, 1957)</i>		Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.											
		BILLETS, BLOOMS, SLABS			PIL- ING	SHAPES STRUCTURALS			STRIP				
Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide- Flange	Hot- rolled	Cold- rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot- rolled	Alloy Cold- rolled	
Bethlehem, Pa.			\$107.00 <i>B3</i>		5.05 <i>B3</i>	7.40 <i>B3</i>	5.05 <i>B3</i>						
Suffolk, N. Y.	\$74.00 <i>B3</i> , <i>R3</i>	\$91.50 <i>B3</i> , <i>R3</i>	\$107.00 <i>B3</i> , <i>R3</i>	5.90 <i>B3</i>	5.05 <i>B3</i>	7.40 <i>B3</i>	5.05 <i>B3</i>	4.675 <i>B3</i> , <i>R3</i>	6.85 <i>R7</i>	6.95 <i>B3</i>			
Claymont, Del.													
Harrison, N. J.													14.55 <i>C11</i>
Conshohocken, Pa.		\$96.50 <i>A2</i>	\$114.00 <i>A2</i>						4.725 <i>A2</i>	6.90 <i>A2</i>	6.95 <i>A2</i>		
New Bedford, Mass.										7.30 <i>R6</i>			
Johnstown, Pa.	\$74.00 <i>B3</i>	\$91.50 <i>B3</i>	\$107.00 <i>B3</i>		5.05 <i>B3</i>	7.40 <i>B3</i>							
Boston, Mass.										7.40 <i>T8</i>			14.90 <i>T8</i>
New Haven, Conn.										7.30 <i>D1</i>			
Baltimore, Md.										6.85 <i>T8</i>			
Phoenixville, Pa.					5.85 <i>P2</i>		5.85 <i>P2</i>						
Sparrows Pt., Md.									4.675 <i>B3</i>		6.95 <i>B3</i>		
Bridgeport, Wallingford, Conn.	\$79.00 <i>N8</i>	\$96.50 <i>N8</i>	\$107.00 <i>N8</i>							7.30 <i>W1</i>	6.95 <i>N8</i>		
Pawtucket, R. I.										7.42 <i>A5,N7</i>			14.90 <i>N7</i>
Alton, Ill.									4.875 <i>L1</i>				
Ashland, Ky.									4.675 <i>A7</i>				
Canton-Massillon, Dover, Ohio		\$94.00 <i>R3</i>	\$107.00 <i>R3</i> , <i>T5</i>							6.85 <i>G4</i>		10.10 <i>G4</i>	14.55 <i>G4</i>
Chicago, Ill. Franklin Park, Ill.	\$74.00 <i>U1</i> , <i>R3</i>	\$91.50 <i>U1</i> , <i>R3,W8</i>	\$107.00 <i>U1</i> , <i>R3,W8</i>	5.90 <i>U1</i>	5.00 <i>U1</i> , <i>W8</i>	7.35 <i>U1,Y1</i>	5.00 <i>U1</i>	4.675 <i>N4</i>	6.95 <i>A1,78</i>				7.75 <i>W8</i> , <i>S9</i> 14.55 <i>A1</i> , <i>S9,18</i>
Cleveland, Ohio										6.85 <i>A5,J3</i>			7.75 <i>J3</i>
Detroit, Mich.			\$107.00 <i>R5</i>						4.775 <i>G3</i> , <i>M2</i>	6.95 <i>M2,G3</i> , <i>D2,P11</i>	7.05 <i>G3</i>	10.10 <i>G3</i> , <i>D2</i>	7.75 <i>G3</i>
Anderson, Ind.										6.85 <i>G4</i>		10.10 <i>G4</i>	
Duluth, Minn.													
Gary, Ind. Harbor, Indiana	\$74.00 <i>U1</i>	\$91.50 <i>U1</i>	\$107.00 <i>U1</i> , <i>Y1</i>	5.90 <i>I3</i>	5.00 <i>U1</i>	7.35 <i>U1,I3</i>	5.25 <i>I3</i>	4.675 <i>U1</i> , <i>I3,Y1</i>	6.85 <i>Y1</i>	6.95 <i>U1</i> , <i>I3,Y1</i>	10.20 <i>Y1</i>	7.75 <i>U1</i> , <i>Y1</i>	
Sterling, Ill.	\$74.00 <i>N4</i>								4.775 <i>N4</i>				
Indianapolis, Ind.										7.00 <i>C5</i>			
Newport, Ky.													7.75 <i>A9</i>
Middletown, Ohio													
Niles, Warren, Ohio Sharon, Pa.		\$91.50 <i>S1</i> , <i>C10</i>	\$107.00 <i>S1</i> , <i>C10</i>						4.675 <i>S1</i> , <i>R3</i>	6.85 <i>T4</i>	6.95 <i>S1</i> , <i>R3</i>	10.00 <i>S1</i> , <i>R3</i>	7.75 <i>S1</i> 14.55 <i>S1</i>
Pittsburgh, Pa. Midland, Pa. Butler, Pa.	\$74.00 <i>U1</i>	\$91.50 <i>U1</i> , <i>C11</i>	\$107.00 <i>U1</i> , <i>C11</i>	5.90 <i>U1</i>	5.00 <i>U1</i> , <i>J3</i>	7.35 <i>U1</i> , <i>J3</i>	5.00 <i>U1</i>	4.675 <i>P6</i>	5.750 <i>P6</i>	6.85 <i>J3,B4</i> , <i>S7</i>			7.75 <i>S9</i> 14.55 <i>S9</i>
Portsmouth, Ohio													
Wairton, Wheeling, Follansbee, W. Va.					5.00 <i>W3</i>				4.675 <i>W3</i>	6.85 <i>W3,F3</i>	6.95 <i>W3</i>	9.65 <i>W3</i>	
Youngstown, Ohio	\$74.00 <i>R3</i>	\$91.50 <i>Y1</i> , <i>C10</i>	\$107.00 <i>Y1</i>		5.00 <i>Y1</i>	7.35 <i>Y1</i>		4.675 <i>U1</i> , <i>Y1</i>	6.85 <i>Y1,C5</i>	6.95 <i>U1</i> , <i>Y1</i>	10.20 <i>Y1</i>	7.75 <i>U1</i> , <i>Y1</i>	
Fontana, Cal.	\$83.50 <i>K1</i>	\$101.00 <i>K1</i>	\$128.00 <i>K1</i>		5.75 <i>K1</i>	8.10 <i>K1</i>	5.90 <i>K1</i>	5.525 <i>K1</i>	8.70 <i>K1</i>				
Geneva, Utah	\$91.50 <i>C7</i>				5.00 <i>C7</i>	7.35 <i>C7</i>							
Kansas City, Mo.					5.10 <i>S2</i>	7.45 <i>S2</i>		4.925 <i>S2</i>		7.20 <i>S2</i>			
Los Angeles, Torrance, Cal.		\$101.00 <i>B2</i>	\$127.00 <i>B2</i>		5.70 <i>C7</i> , <i>B2</i>	3.05 <i>B2</i>		5.425 <i>B2</i> , <i>C7</i>	8.80 <i>C1</i>				8.95 <i>B2</i>
Minnequa, Colo.					5.30 <i>C6</i>				5.775 <i>C6</i>				
Portland, Ore.					5.75 <i>O2</i>								
San Francisco, Niles, Pittsburg, Cal.		\$101.00 <i>B2</i>			5.65 <i>B2</i>	8.00 <i>B2</i>		5.425 <i>C7,B2</i>					
Seattle, Wash.		\$105.00 <i>B2</i>			5.75 <i>B2</i>	8.10 <i>B2</i>		5.675 <i>B2</i>					
Atlanta, Ga.								4.875 <i>A8</i>					
Fairfield, Ala. City, Birmingham, Ala.	\$74.00 <i>T2</i>	\$91.50 <i>T2</i>			5.30 <i>T2,R3</i>	7.35 <i>T2</i>		4.675 <i>T2,R3</i>	4.975 <i>C10</i>	4.925 <i>C16</i>	6.95 <i>T2</i>		
Houston, Lone Star, Texas	\$80.00 <i>L3</i>	\$96.50 <i>S2</i>	\$112.00 <i>S2</i>		5.10 <i>S2</i>	7.45 <i>S2</i>		4.925 <i>S2</i>		7.20 <i>S2</i>			

STEEL PRICES

(Effective
Feb. 12, 1957)*Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.*

SHEETS										WIRE ROD	TINPLATE†		BLACK PLATE	
	Hot-rolled 1/8 in. & h.vyr.	Cold- rolled	Galvanized	Enamel- ing	Long Terne	Hi Str. Low Alloy H.R.	H Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot- rolled 1/8 in.		Cokes* 1/25-lb. base box	Electro* 0.25-lb. base box	Holloware Enameling 29 ga.	
EAST														
Bethlehem, Pa.														
Buffalo, N. Y.	4.675 B3	5.75 B3				6.90 B3	8.525 B3			5.80 W6				
Claymont, Del.														
Costeville, Pa.														
Conshohocken, Pa.	4.725 A2	5.80 A2				6.95 A2								
Harriburg, Pa.														
Hartford, Conn.														
Johnstown, Pa.														
Fairless, Pa.	4.725 U1	5.80 U1				6.95 U1	8.575 U1			5.80 B3				
New Haven Conn.														
Phoenixville, Pa.														
Sparrows Pt., Md.	4.675 B3	5.75 B3	6.30 B3			6.90 B3	8.575 B3	9.275 B3		5.90 B3	\$9.80 B3	\$8.50 B3		
Worcester, Mass.											6.10 A5			
Trenton, N. J.														
Alton, Ill.											6.90 L1			
Ashland, Ky.	4.675 A7		6.30 A7	6.325 A7										
Canton-Muskegon, Dover, Ohio			6.30 R3, R1											
Chicago, Juliet, Ill.	4.675 W8, A1					6.90 U1				5.80 K2	5.80 A5, R3, N4, W8, K2			
Sterling, Ill.											5.90 N4, K2			
Cleveland, Ohio	4.675 J3, R3	5.75 J3, R3		6.325 R3		6.90 R3	8.525 R3, J3				5.80 A5			
Detroit, Mich.	4.775 G3, M2	5.85 G3 5.75 M2				7.00 G2	8.625 G3							
Newport, Ky.	4.675 A9	5.75 A9												
Gary, Ind. Harbor, Indiana	4.675 U1, J3, Y1	6.30 U1, J3	6.325 U1, J3, Y1	6.70 U1	6.90 U1, Y1, J3	8.525 U1, Y1				5.80 Y1	\$9.70 U1, Y1	\$8.40 J3, U1, Y1	7.15 U1, Y1	
Granite City, Ill.	4.875 G2	5.95 G2	6.50 G2	6.525 G2								\$8.50 G2	7.25 G2	
Kokomo, Ind.			6.40 C9								5.90 C9			
Manfield, Ohio		5.75 E2			6.70 E2									
Middletown, Ohio		5.75 A7	6.30 A7	6.325 A7	6.70 A7									
Niles, Warren, Ohio Sharon, Pa.	4.675 S1, R3, R3	5.75 R3	6.30 R3	6.325 N3	6.70 N3	6.90 S1, R3	8.525 S1, R3					\$8.40 R3		
Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.675 U1, J3, P6	6.30 U1, J3	6.325 U1			6.90 U1, J3, R3	8.525 U1, J3	9.275 U1		5.80 A5, P6, J3	\$9.70 J3, U1	\$8.40 U1, J3	7.15 U1, J3	
Portsmouth, Ohio	4.675 P7		5.75 P7								5.80 P7			
Watertown, Wheeling, Fallsburg, W. Va.		5.75 W3, W5	6.30 W3, W5		6.70 W3, W5	6.90 W3	8.525 W3					\$9.70 W5	\$8.40 W5 7.40 W3	
Youngstown, Ohio	4.675 U1, Y1		5.75 Y1		6.325 Y1	6.90 Y1	8.525 Y1				5.80 Y1		7.15 Y1	
MIDDLE WEST														
Fenton, Mich.	5.525 K1	7.00 K1				7.75 K1	9.775 K1					\$10.45 K1	\$9.15 K1	
Geneva, Utah	4.775 C7													
Kansas City, Mo.												6.05 S2		
Los Angeles, Terrance, Cal.												6.60 B2		
Minneapolis, Colo.												6.05 C6		
San Francisco, Niles, Pittsburg, Cal.	5.375 C7	6.70 C7	7.05 C7									6.45 C7	\$10.45 C7	\$9.15 C7
Seattle, Wash.														
WEST														
Atlanta, Ga.														
Fairfield, Ala. Alabama City, Ala.	4.675 T2, R3	5.75 T2, R3	6.30 T2, R3								5.80 T2, R3	\$9.80 T2	\$8.50 T2	
Houston, Tex.												6.05 S3		
SOUTH														

IRON AGE STEEL PRICES <i>(Effective Feb. 12, 1957)</i>		Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.									
		BARS					PLATES				WIRE
Carbon† Steel	Reinfore- cing	Cold Finished	Alloy Hot- rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright	
Bethlehem, Pa.			6.125 B3	8.325 B3	7.40 B3						
Buffalo, N. Y.	5.075 B3, R3	5.075 B3, R3	6.90 B5	6.125 B3, R3	8.325 B5, B3	7.40 B3	4.85 B3			7.20 W6	
Clayton, Del.							5.70 C4		6.85 C4	7.55 C4	
Coatesville, Pa.							5.25 L4		6.85 L4	7.55 L4	
Conshohocken, Pa.							4.95 A2	5.925 A2	6.85 A2	7.25 A2	
Harrisburg, Pa.							5.80 P2	6.275 P2			
Hartford, Conn.		7.35 R3		8.625 R3	7.40 B3						
Johnstown, Pa.	5.075 B3	5.075 B3		6.125 B3			4.85 B3		6.85 B3	7.20 B3	
Fairless, Pa.		5.225 U1	5.225 U1		6.275 U1						
Newark, N. J.			7.30 W10		8.50 W10						
Camden, N. J.			7.30 P10		8.50 P10						
Bridgeport, Conn. Pulaski, Conn.	5.30 N8	5.30 N8	7.28 N8 7.40 W10	6.20 N8	8.475 N8	7.50 N8					
Sparrows Pt., Md.		5.075 B3					4.85 B3		6.85 B3	7.30 B3	
Palmer, Worcester, Readville, Mass. Milton, Pa.		5.225 M7	5.225 M7	7.40 B5, C14		8.325 A5				7.58 A5, W6	
Spring City, Pa.					8.625 B5					9.025 T8	
Alton, Ill.	5.275 L1				8.50 K4					7.40 L1	
Ashland, Newport, Ky							4.85 A7, A9		6.85 A9		
Canton, Massillon, Ohio			6.85 R3, R2	6.125 R3, T5	8.325 R3, R2, T5						
Chicago, Joliet, Ill.	5.075 U1, R3, W8, N4 5.575 P13	5.075 U1, R3, N4 5.575 P13	6.85 A5, B5, W10, L2, W8, N9	6.125 U1, R3, W8	8.325 A5, B5, W8, L2, N9, W10	5.875 W8	4.85 U1, I3, W8, A1	5.925 U1	6.85 U1, W8	7.25 U1	7.20 A5, K2 R3, N4, W7
Cleveland, Ohio	5.075 R3	5.075 R3	6.85 A5, C13		8.325 A5, C13	7.425 R3	4.95 J3, R3	5.925 J3		7.25 J3, R3	7.20 A5, C13
Detroit, Mich.	5.175 G3	5.425 G3	7.05 B5, P8 7.10 P3 6.85 R5	6.225 G3 6.125 R5	8.525 B5, P3, J8 8.325 R5	7.525 G3	4.95 G3		6.90 G3		
Duluth, Minn.											7.20 A5
Gary, Ind. Harbor, Crawfordsville	5.075 U1, I3, Y1	5.075 U1, I3, Y1	6.85 R3, M5	6.125 U1, I3, Y1	8.325 R3, M4	7.425 U1, I3, Y1	4.85 U1, I3, Y1	5.925 I3	6.85 U1, Y1	7.25 U1, Y1	7.30 M4
Granite City, Ill.							5.05 G2				
Kokomo, Ind.											7.30 C9
Sterling, Ill.	5.175 N4	5.175 N4									7.30 K2
Niles, Warren, Ohio Sharon, Pa.			6.85 C10	6.125 C10, S1	8.325 C10	7.425 S1	4.85 S1, R3		6.85 S1	7.25 S1, R3	
Pittsburgh, Pa. Midland, Pa.	5.075 U1, C11, J3	5.075 U1, J3	6.85 A5, C8, J3, R3, S9, B4, W10, C11	6.125 U1, C11, J3	8.325 A5, R3, S9, C8, W10, C11	7.425 U1, J3	4.85 U1, J3	5.925 U1	6.85 U1, J3	7.25 U1, J3	7.20 A5, J3, P6
Portsmouth, Ohio											7.20 P7
Wirtton, Wheeling, Fellowes, W. Va.							4.85 W5				
Youngstown, Ohio	5.075 U1, Y1, R3	5.075 U1, Y1, R3	6.85 U1, Y1, F2	6.125 U1, Y1	8.325 Y1, F2	7.425 U1, Y1	4.85 U1, Y1, R3		6.85 Y1	7.25 Y1	7.20 Y1
Emeryville, Cal.	5.825 J5	5.825 J5									
Fontana, Cal.	5.775 K1	5.775 K1		7.175 K1		8.125 K1	5.60 K1		7.60 K1	8.00 K1	
Geneva, Utah	5.175 C7						4.85 C7			7.25 C7	
Kansas City, Mo.	5.325 S2	5.325 S2		6.375 S2		7.675 S2					7.45 S2
Los Angeles, Torrance, Cal.	5.775 C7, B2	5.775 C7, B2	8.30 R3, P14	7.175 B2	10.10 P14	8.125 B2					8.15 B2
Minneapolis, Colo.	5.525 C6	5.525 C6					5.70 C6				7.45 C6
Portland, Ore.	5.825 O2	5.825 O2									
San Francisco, Niles, Pittsburg, Cal.	5.775 C7 5.825 B2 6.025 P9				8.175 B2						8.15 C7, C8
Seattle Wash.	5.825 B2 N8	5.825 B2			8.175 B2	5.75 B2		7.75 B2	8.15 B2		
Atlanta, Ga.	5.575 A8										7.40 A8
Fairfield, Ala. City, Birmingham, Ala.	5.075 T2, R3 5.325 C16	5.075 T2, R3 5.325 C16	7.45 C16		7.425 T2	4.85 T2, R3			7.25 T2	7.20 T2, R3	
Houston, Ft. Worth, Lone Star, Tex.	5.325 S2	5.325 S2		6.375 S2		7.675 S2	4.95 S2 5.20 L3		6.95 S2	7.35 S2	7.45 S2

† Merchant Quality—Specialty Quality .35¢ higher.

Steel Prices (Effective Feb. 12, 1957)

Key to Steel Producers

With Principal Offices

A1	Acme Steel Co., Chicago
A2	Alan Wood Steel Co., Conshohocken, Pa.
A3	Allegheny Ludlum Steel Corp., Pittsburgh
A4	American Cladmetals Co., Carnegie, Pa.
A5	American Steel & Wire Div., Cleveland
A6	Angel Nail & Chaplet Co., Cleveland
A7	Armen Steel Corp., Middleboro, Ohio
A8	Atlantic Steel Co., Atlanta, Ga.
A9	Acme Newport Steel Co., Newport, Ky.
B1	Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2	Bethlehem Pacific Coast Steel Corp., San Francisco
B3	Bethlehem Steel Co., Bethlehem, Pa.
B4	Blair Strip Steel Co., New Castle, Pa.
B5	Bliss & Laughlin, Inc., Harvey, Ill.
B6	Brook Plant, Wickware-Spencer Steel Div., Birmahoro, Pa.
C1	Calstrip Steel Corp., Los Angeles
C2	Carpenter Steel Co., Reading, Pa.
C3	Central Iron & Steel Co., Harrisburg, Pa.
C4	Claymont Products Dept., Claymont, Del.
C5	Cold Metals Products Co., Youngstown, O.
C6	Colorado Fuel & Iron Corp., Denver
C7	Columbia Geneva Steel Div., San Francisco
C8	Columbia Steel & Shattuck Co., Pittsburgh
C9	Continental Steel Corp., Kokomo, Ind.
C10	Copperweld Steel Co., Pittsburgh, Pa.
C11	Crucible Steel Co. of America, Pittsburgh
C12	Cumberland Steel Co., Cumberland, Md.
C13	Cuyahoga Steel & Wire Co., Cleveland
C14	Compressed Steel Shunting Co., Regisville, Mass.
C15	G. O. Carbon Inc., Thorndale, Pa.
C16	Connors Steel Div., Birmingham
C17	Chester Blast Furnace, Inc., Chester, Pa.
D1	Detroit Steel Corp., Detroit
D2	Dearborn Div., Sharon Steel Corp.
D3	Driver Harris Co., Harrison, N. J.
D4	Dickson Weatherhead Nad Co., Evanston, Ill.
D5	Henry Dillston Div., Philadelphia
E1	Eastern Stainless Steel Corp., Baltimore
E2	Empire Steel Co., Mansfield, O.
F1	Firth Sterling, Inc., McKeesport, Pa.
F2	Fitzsimmons Steel Corp., Youngstown

F3	Follansbee Steel Corp., Follansbee, W. Va.
G2	Granite City Steel Co., Granite City, Ill.
G3	Great Lakes Steel Corp., Detroit
G4	Green Steel Co., Dover, O.
H1	Hanna Furnace Corp., Detroit
H2	Ingersoll Steel Div., Chicago
H3	Inland Steel Co., Chicago
H4	Interlake Iron Corp., Cleveland
J1	Jackson Iron & Steel Co., Jackson, O.
J2	Jesop Steel Corp., Washington, Pa.
J3	Jones & Laughlin Steel Corp., Pittsburgh
J4	Joslyn Mfg. & Supply Co., Chicago
J5	Judson Steel Corp., Emeryville, Calif.
K1	Kaiser Steel Corp., Fontana, Cal.
K2	Keystone Steel & Wire Co., Peoria
K3	Koppers Co., Granite City, Ill.
K4	Keystone Drawn Steel Co., Spring City, Pa.
L1	Laclede Steel Co., St. Louis
L2	La Salle Steel Co., Chicago
L3	Lone Star Steel Co., Dallas
L4	Lukens Steel Co., Coatesville, Pa.
M1	Mahoning Valley Steel Co., Niles, O.
M2	McLouth Steel Corp., Detroit
M3	Mercer Tube & Mfg. Co., Sharon, Pa.
M4	Mid States Steel & Wire Co., Crawfordsville, Ind.
M5	Monarch Steel Div., Hammond, Ind.
M6	Mystic Iron Works, Everett, Mass.
M7	Milton Steel Products Div., Milton, Pa.
N1	National Supply Co., Pittsburgh
N2	National Tube Div., Pittsburgh
N3	Niles Rolling Mill Div., Niles, O.
N4	Northwestern Steel & Wire Co., Sterling, Ill.
N5	Northwest Steel Rolling Mills, Seattle
N6	Newman Crosby Steel Co., Pawtucket, R. I.
N7	Northeastern Steel Corp., Bridgeport, Conn.
N8	Nelson Steel & Wire Co.
N9	Oliver Iron & Steel Co., Pittsburgh
N10	Oregon Steel Mills, Portland
P1	Page Steel & Wire Div., Monessen, Pa.
P2	Phoenix Iron & Steel Co., Phoenixville, Pa.
P3	Pilgrim Drawn Steel Div., Plymouth, Mich.
P4	Pittsburgh Coke & Chemical Co., Pittsburgh
P5	Pittsburgh Screw & Bolt Co., Pittsburgh
P6	Pittsburgh Steel Co., Pittsburgh
P7	Portsmouth Div., Detroit Steel Corp., Detroit
P8	Plymouth Steel Co., Detroit
P9	Pacific States Steel Co., Niles, Cal.
P10	Precision Drawn Steel Co., Camden
P11	Production Steel Strip Corp., Detroit
P13	Phoenix Mfg. Co., Joliet, Ill.
P14	Pacific Tube Co.
R1	Reeves Steel & Mfg. Co., Dover, O.
R2	Reliance Div., Eaton Mfg. Co., Massillon, O.
R3	Republic Steel Corp., Cleveland
R4	Roebling Sons Co., John A. Trenton, N. J.
R5	Rotary Electric Steel Co., Detroit
R6	Rodney Metals, Inc., New Bedford, Mass.
R7	Rome Strip Steel Co., Rome, N. Y.
S1	Sharon Steel Corp., Sharon, Pa.
S2	Sheffield Steel Div., Kansas City
S3	Shenango Furnace Co., Pittsburgh
S4	Simonds Saw and Steel Co., Fitchburg, Mass.
S5	Sweet's Steel Co., Williamsport, Pa.
S6	Standard Forging Corp., Chicago
S7	Stanley Works, New Britain, Conn.
S8	Superior Drawn Steel Co., Monaca, Pa.
S9	Superior Steel Corp., Carnegie, Pa.
S10	Semana Steel Service, Buffalo
T1	Tonawanda Iron Div., N. Tonawanda, N. Y.
T2	Tennessee Coal & Iron Div., Fairfield
T3	Tennessee Products & Chem. Corp., Nashville
T4	Thomas Steel Div., Warren, O.
T5	Timken Steel & Tube Div., Canton, O.
T7	Texas Steel Co., Fort Worth
T8	Thompson Wire Co., Boston
U1	United States Steel Corp., Pittsburgh
U2	Universal Cyclopa Steel Corp., Bridgeville, Pa.
U3	Ulbrich Stainless Steels, Wallingford, Conn.
U4	U. S. Pipe & Foundry Co., Birmingham
W1	Waddington Steel Co., Wallingford, Conn.
W2	Washington Steel Corp., Washington, Pa.
W3	Weirton Steel Co., Weirton, W. Va.
W4	Wheatland Tube Co., Wheatland, Pa.
W5	Wheeling Steel Corp., Wheeling, W. Va.
W6	Wickwire Spencer Steel Div., Buffalo
W7	Wilson Steel & Wire Co., Chicago
W8	Wisconsin Steel Div., S. Chicago, Ill.
W9	Woodward Iron Co., Woodward, Ala.
W10	Wyckoff Steel Co., Pittsburgh
W12	Wallace Barnes Steel Div., Bristol, Conn.
Y1	Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (per cent) f.o.b. mills. Base price about \$200 per net ton.

BUTTWELD												SEAMLESS												
1/2 in.		5/8 in.		1 in.		1 1/4 in.		1 1/2 in.		2 in.		2 1/2 in.		3 in.		3 1/2-4 in.		Bik.		Gal.				
Bik.	Gal.	Bik.	Gal.	Bik.	Gal.	Bik.	Gal.	Bik.	Gal.	Bik.	Gal.	Bik.	Gal.	Bik.	Gal.	Bik.	Gal.	Bik.	Gal.	Bik.	Gal.	Bik.	Gal.	
STANDARD T. & C.																								
Sparrows Pt. B1	10.50	+4.75	13.50	+8.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75										
Youngstown R3	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75										
Fontana K1	+0.50	+19.75	2.50	+15.75	5.00	+12.50	7.50	+10.5	8.00	+9.50	8.50	+12.00	10.00	+5.25										
Pittsburgh J1	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25		
Alton, Ill. L1	10.50	+4.75	13.50	+0.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75										
Sharon M1	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75										
Fairless N2	7.25	-8.00	10.25	+4.00	13.75	0.50	16.25	1.25	16.75	2.25	17.25	2.75	18.75	2.50										
Pittsburgh N1	9.25	-6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.25	5.00	5.25	+20.25	1.25	+16.50	3.75	+13.00	5.25	+11.50		
Wheeling W5	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75										
Wheatland W4	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75										
Youngstown Y1	9.25	-6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.25	5.00	5.25	+20.25	1.25	+16.50	3.75	+13.00	5.25	+11.50		
Indiana Harbor Y1	11.50	+5.75	14.50	1.25	17.00	3.75	19.50	4.50	20.00	5.50	20.50	6.00	22.00	5.75										
Lorain N2	9.25	-6.00	12.25	+2.00	15.75	2.50	18.25	3.25	18.75	4.25	19.25	4.75	20.25	5.00	5.25	+20.25	1.25	+16.50	3.75	+13.00	5.25	+11.50		
EXTRA STRONG PLAIN ENDS																								
Sparrows Pt. B1	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75										
Youngstown R3	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75										
Udalla N2	17.00	-2.00	15.75	2.00	18.75	6.50	19.25	5.25	19.75	6.25	20.25	6.75	20.75	5.50										
Fontana K1	4.00		8.00		10.00		10.50		11.00		11.50		12.00											
Pittsburgh J1	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25		
Alton, Ill. L1	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75										
Sharon M1	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75										
Pittsburgh N1	13.75	0.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+10.50	11.25	+5.50		
Wheeling W5	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75										
Wheatland W4	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75										
Youngstown Y1	13.75	0.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+10.50	11.25	+5.50		
Indiana Harbor Y1	16.00	2.25	20.00	6.25	22.00	9.75	22.50	8.50	23.00	9.50	23.50	10.00	22.00	8.75										
Lorain N2	13.75	0.00	17.75	4.00	20.75	8.50	21.25	7.25	21.75	8.25	22.25	8.75	22.75	7.50	3.75	+17.75	3.75	+12.00	6.25	+10.50	11.25	+5.50		

Threads only, butt-welded and seamless 2 1/4 pt. higher discount. Plain ends, butt-welded and seamless, 3-in. and under, 5 1/2 pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: 1 1/2, 3 1/4 and 1-in., 2 pt.; 1 1/4, 1 1/2 and 2-in., 1 1/2 pt.; 2 1/2 and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2 1/2 and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.50¢ per lb.

TOOL STEEL**F.o.b. mill**

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	\$1.68	T-1
18	4	1	—	6	2.385	T-4
18	4	2	—	—	1.185	T-2
18	4	1.5	—	—	1.04	M-1
6	4	3	6.00	—	1.43	M-3
6	4	3	5	—	1.185	M-2
High-carbon chromium					.83	D-3, D-5
Oil hardened manganese					.45	O-2
Special carbon					.41	W-1
Extra carbon					.345	W-1
Regular carbon					.29	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

Cladding	Plate (A3, J2, L6)			Sheet (J2)		
	10 pct	15 pct	20 pct	10 pct	15 pct	20 pct
202						35.50
304	34.60	38.00	41.50			37.75
316	39.70	43.20	46.65			55.50
321	36.35	39.80	43.50			44.75
347	39.50	43.95	48.45			54.25
405	29.20	33.15	37.05			
410, 430	28.70	32.65	36.55			

CR Strip (S9) Copper, 10 pct, 2 sides, 40.85; 1 side, 33.50.

ELECTRICAL SHEETS

F.o.b. Mill Cents Per Lb	22-Gage (Cut Lengths)*	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length)	
			Semi- Processed	Fully Processed
			Grain Oriented	
Field	9.00	9.20		
Armature	10.35	10.35	10.85	
Elect.	11.00	11.025	11.525	
Meter	12.05	12.075	12.575	
Dyno	13.05	13.05	13.55	
Trans. 72	14.05	14.05	14.55	
Trans. 65	14.60			

Producing points: Beech Bottom (W5); Brackenridge (A5); Granite City (G2); Indiana Harbor (I3); Mansfield (E2); Newport, Ky. (N5); Niles, O. (N3); Vandergrift (U1); Warren, O. (R3) (20¢ higher, HR); Zanesville, Butler (A7).

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake ports. Prices for 1957 season. Freight changes for seller's account.

Gross Ton

Openhearth lump	\$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails		Woven Wire	"T" Fence Posts	Galv. Barbed and Twisted Barbless Wire	March. Wire Rod	March. Wire Gals.
	Cal	Col	Cal	Col	Col	Col	Col
Alabama City R3	167	181	195	187	8.10	8.50	
Aliquippa, Pa. J3***	164	179	181	179	8.75	8.475	
Atlanta A3**	166	182	192	190	8.05	8.65	
Bartonsville K2**	166	182	192	190	8.05	8.65	
Buffalo W6					8.10	8.50	
Chicago, Ill. N4**	164	180	167	190	188	7.95	8.55
Cleveland A6	173				8.10		
Cleveland A5					7.95		
Crawfordsville M4**	166	182	192	190	8.05	8.65	
Denora, Pa. A5	164	176	190	184	7.95	8.35	
Duluth A5	164	176	190	184	7.95	8.35	
Fairfield, Ala. T2	164	176	190	184	7.95	8.35	
Galveston D4	169						
Houston S2	169	181	195	189	8.20	8.60	
Johnstown, Pa. B3**	164	180	167	188	7.95	8.55	
Joliet, Ill. A5	164	176	190	184	7.95	8.35	
Kokomo, Ind. C9*	166	178	192	186	8.05	8.45	
Los Angeles B2**	169	181	195	189	8.20	8.60	
Kansas City S2*	169	181	195	189	8.20	8.60	
Minnequa C6†	169	181	172	195	8.20	8.60	
Monessen P6	167	185			191	8.10	8.10
Pittsburg, Pa. C7	166	199			204	8.90	9.30
Portsmouth P7					7.95		
Rankin, Pa. A5	164	176			184	7.95	8.35
So. Chicago R3	167	181	195	187	8.10	8.50	
So. San Francisco C6					214	8.90	9.30
Sparrow Pt. Pa. B3**	166		192	190	8.05	8.65	
Siruthers, O. Y1					7.95	8.45	
Worcester A5	170				8.25	8.65	
Williamsport, Pa. S5			175				

* Zinc less than .10¢.

† Plus zinc extras.

** 13.5 zinc.

† Wholesalers only.

C-R SPRING STEEL

F.o.b. Mill	CARBON CONTENT				
	0.26- 0.40	0.41- 0.60	0.61- 0.80	0.81- 1.05	1.06- 1.35
Baltimore, Md. T8	8.25	10.10	12.30	15.30	18.25
Bristol, Conn. W12			12.30	15.30	18.25
Boston T8	8.50	10.10	12.30	15.30	18.25
Buffalo, N.Y. R7	7.95	9.80	12.60	15.00	17.95
Carnegie, Pa. S9	†	9.80	12.00	15.00	
Cleveland A5	7.95	9.80	12.00	15.00	17.95
Detroit D1	8.05	9.90	12.10	15.10	
Detroit D2	8.75	10.20	12.40		
Dover, O. G4	7.95	9.80	12.00	15.00	17.95
Franklin Park, Ill. T8	8.95	9.80	12.60	15.00	17.95
Harrison, N.J. C11			12.30	15.30	18.25
Indianapolis C5	8.10	9.95	12.60	15.00	17.95
New Castle, Pa. B4	7.95	9.80	12.60	15.00	
New Haven, Conn. D1	8.40	10.10	12.30	15.30	
Pawtucket, R.I. N7	8.50	10.10	12.30	15.30	18.25
Pittsburgh, R.I. S7	7.95	9.80	12.60	15.00	17.95
Riverdale, Ill. A1	8.05	9.80	12.00	15.00	17.95
Sharon, Pa. S7	8.65	10.10	12.30	15.30	18.25
Trenton R4			10.10	12.90	15.30
Wallingford W1	8.40	10.10	12.30	15.30	18.15
Warren, Ohio T4	7.95	9.80	12.60	15.00	17.95
Weirton, W. Va. W3	7.95	9.80	12.60	15.00	17.95
Worcester, Mass. A5	8.50	10.10	12.30	15.30	18.25
Taunton C5	7.95	9.80	12.60	15.00	17.95

‡ On Application.

BOILER TUBES

F.o.b. Mill	Size					Seamless	Elec. Weld
	OD-In.	B.W. Ga.	H.R.	C.D.	H.R.		
Babcock & Wilcox	2	13	34.88	40.85	33.21		
	2½	12	46.98	55.01	44.73		
	3	12	54.24	63.53	51.66		
	3½	11	63.32	74.16	60.30		
	4	10	84.09	98.47	80.07		
National Tube	2	13	34.88	40.85	33.21		
	2½	12	46.98	55.01	44.73		
	3	12	54.24	63.53	51.66		
	3½	11	63.32	74.16	60.30		
	4	10	84.09	98.47	80.07		
Pittsburgh Steel	2	13	34.88	40.85			
	2½	12	46.98	55.01			
	3	12	54.24	63.53			
	3½	11	63.32	74.16			
	4	10	84.09	98.47			

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

**F.O.B. Plant, warehouse price. †16 gage. ‡13 1/2¢ zinc. §Deduct for country del'ry.

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Jamb Bars	Track Spikes	Scree Spikes	Tin Plates	Track Bolts Untreated
Bessemer U.I.	5.075	6.00	6.35				
So. Chicago R.I.	5.075	6.00		8.775			
Endley T2	5.075	6.00					
Fairfield T2	6.00			8.775		6.025	
Carry U.I.	5.075	6.00				6.025	
Huntington C16	6.00						
Ind. Harbor I1	5.075	6.00		6.35	8.775	6.025	
Ind. Harbor Y1	6.00						
Johnstown B3							
Joliet U.I.	5.075	6.35					
Kansas City S2							
Lackawanna B3	5.075	6.00	6.35			6.025	
Lakehams B3							
Minnequa C6	5.075	6.50	6.35	8.775		13.10	
Pittsburgh P5							
Pittsburgh J3							
Seattle B2							
Steelton B3	5.075	6.35				6.175	13.16
Struthers Y1						9.275	
Terreton C7							
Williamsport S3	6.15						
Youngstown R3							
				8.775			

COKE

Furnace, beehive (f.o.b. oven)	Net-Ton
Connellsville, Pa.	\$15.00 to \$15.75
Foundry, beehive (f.o.b. oven)	
	\$17.50 to \$19.00
Foundry oven coke	
Buffalo, d'd	\$31.75
Detroit, f.o.b.	30.50
New England, d'd	31.55
Kearney, N. J. f.o.b.	30.00
Philadelphia, f.o.b.	29.50
Swedesdale, Pa. f.o.b.	29.50
Patmosville, Ohio, f.o.b.	30.50
Erie, Pa., f.o.b.	30.50
Cleveland, d'd	32.55
Cincinnati, d'd	31.84
St. Paul, f.o.b.	29.75
St. Louis, f.o.b.	31.50
Birmingham, f.o.b.	28.85
Milwaukee, f.o.b.	30.50
Lone Star, f.o.b.	25.50
Neville, Pa.	29.25

ELECTRODES

Cents per lb f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	24.75	40	100,110	10.70
20	72	24.00	35	110	10.70
16 to 18	72	24.50	30	110	10.85
14	72	25.00	24	72 to 84	11.25
12	72	25.50	20	90	11.00
10	60	26.50	17	72	11.40
9	48	27.00	14	72	11.85
7	60	26.75	12	60	12.95
6	60	30.00	10	60	13.00
4	33.25	35.25	8	60	13.30
3	40	35.25			
2 1/2	30	37.25			
2	24	57.75			

*Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES**Anodes**

(Cents per lb, f.o.b. shipping point)

Copper	
Cast, elliptical, 18 in. or longer, 5000 lb lots	53.42
Electrodeposited	43.28
Brass, 80-20, ball anodes, 2000 lb or more	
Zinc, ball anodes, 2000 lb lots	21.25
Nickel, 99 per cent plus, rolled carbon, 5000 lb	\$1.0225
(for elliptical add 2¢ per lb)	
Cadmium	\$1.70
Tin, ball anodes and elliptical	\$1.07 per in.

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	77.50
Copper sulphate, 100 lb bags, per cwt.	26.65
Nickel salts, single, 100 lb bags	40.50
Nickel chloride, freight allowed, 300 lb	45.50
Sodium cyanide, domestic, f.o.b. N. Y., 200 lb drums	23.05
(Philadelphia price 23.30)	
Zinc cyanide, 100 to 900 lb	55.55
Potassium cyanide, 100 lb drum N. Y.	48.00
Chromeic acid, flake type, 1 to 20 100-439 lb drums	31.75

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)
Pct Discounts

Machine and Carriage Bolts	Full Container Price	30 Containers	20,000 Lb.	40,000 Lb.
1/4" and smaller x 6" and shorter	55	58 1/2	60 1/2	61 1/2
1/8" thru 1" x longer than 6"	48 1/2	50	52 1/2	54
Rolled thread carriage bolts 1/2 in. & smaller x 6" and shorter	55	58 1/2	60 1/2	61 1/2
Lag, all diam. x 6" & shorter	55	58	60	61
Lag, all diam. longer than 6 in.	47	50	52	53
Plow bolts, 1/2" and smaller x 6" and shorter	54	57 1/2	59	60

(Add 25 pct for broken case quantities)

Nuts, Hex, HP reg. & hvy.	Full Case or Keg Price
3/4 in. or smaller	63
7/8 in. to 1 in. inclusive	59 1/2
1 1/8 in. to 1 1/2 in. inclusive	64
1 1/2 in. and larger	58

Hot Galv. Nuts (All Types)

3/4" and smaller

Semi-finished Hex Nuts	50
3/4 in. and smaller	63
7/8 in. to 1 1/4 in. inclusive	59 1/2
1 1/4 in. and larger	58

(Add 25 pct for broken case or keg quantities)

Finished

1" and smaller

Rivets

	Base per 100 lb
	Pct Off List
7/16 in. and smaller	26 1/2

Cap Screws

Discount (Packages)
Bright Treated H. C. Heat

New std. hex head, packaged

5/8" diam. and smaller x 6" and shorter	47	63
5/8" x 3/4" and 1" diam. x 6" and shorter	31	51 1/2
5/8" diam. and smaller x longer than 6"	18 1/2	+ 1
5/8" x 3/4" and 1" diam. & longer than 6"	5 1/2	+ 19 1/2

C-1018 Steel
Full-Finished
Cartons Bulk

1/4" through 5/8" dia. x 6" and shorter

5/8" through 1" dia. x 6" and shorter

Minimum quantity—1/4" through 5/8" dia., 15,000 pieces; 1/16" through 5/8" dia., 5,000 pieces; 3/4" through 1" dia., 2,000 pieces.

Machine Screws & Stove Bolts

Discount
Mach. Stove
Screws Bolts
Cartons

Quantity

To 1/4" diam.

1/8" to 1/2" diam.

All diam. over 3"

long

Discount
Hex Square
In cartons

Quantity

In Bulk

5/8" diam. & smaller

15,000-100,000

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are saying: "Let's use

GRiffin[®] COLD ROLLED STRIP STEEL"

Made to your specifications in all thicknesses from .012 to .375 inches and widths from $\frac{1}{4}$ " to 12" depending upon gauge.

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MANUFACTURING CO. ERIE, PA.



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Make rigid set-ups in minutes on planers, drill presses, milling machines or other T-slotted beds or platens. Clamp slides or rotates to position on anchoring T-slot bolt. Drop forged, heat-treated body. Heat-treated screw has V-slotted swivel cap.

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Bulletin SUT 5209 Armstrong Ave., Chicago 30, U.S.A.

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PRESSURE • STAINLESS
STAINLESS PIPE & FITTINGS

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Templates

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With DYKEM Steel Blue

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2303G North 11th St. • St. Louis 6, Mo.

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on company letterhead

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DYKEM HI-SPOT BLUE No. 107 is used to locate high spots when scraping bearing surfaces. As it does not dry, it remains in condition on metal indefinitely, saving scraper's time. Intensely blue, smooth paste spreads thin, transfers clearly. No grit; nonirritating to metal. Uniform. Available in collapsible tubes of three sizes. Order from your supplier. Write for free sample tube on company letterhead

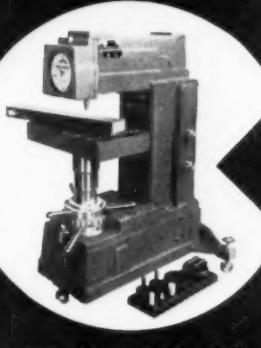
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1 Tester



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1956 Hydraulic EXTRUSION PRESS FOR SALE

- ◆ 484 ton Lake Erie cold horizontal hydraulic extrusion press, new 1956, fully automatic.
- ◆ One Two Three Goss & De Leeuw 7 spindle automatic chucker, complete with chucks and electrical mechanism.
- ◆ #2C-7000 Van Norman Cincinnati centerless grinder, capacity 0" to 4 $\frac{3}{4}$ " diameter.

ADDRESS BOX G-487
c/o The Iron Age, Chestnut & 56th Sts.
Philadelphia 39, Pa.

Ferroalloy Prices

(Effective Feb. 12, 1957)

Ferrochrome

Contract prices, cents per lb contained Cr, jump, bulk, carloads, del'd.	67-71%
Cr, 30-40% max. Si	
0.02% C	41.00
0.03% C	41.00
0.06% C	49.50
0.10% C	39.00
0.15% C	88.75
4.00-4.50% C	67.70% Cr, 1-2% Si
4.50-5.00% C	67.64% Cr, 2.00-4.50% Si
0.025% C (Simplex)	34.75
0.10% C, 50-52% Cr, 2% max. Si	35.75
0.50% max. C, 50-56% Cr, 3-6% Si	24.00
0.50% C, 50-65% Cr, 3% max. Si	24.00

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max 0.10% C price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.	
0.10% max. C	\$1.31
0.50% max. C	1.31
0 to 11% C, 33-91% Cr, 0.75% Fe	1.40

Electrolytic Chromium Metal

Contract prices per lb of metal 2" x D plate (1/4" thick) delivered packed, 99.80% min. Cr (Metallic Base) Fe 0.20 max.	
Carloads	\$1.29
Ton lots	1.31
Less ton lots	1.38

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 5-in. x down, per lb of Cr, packed.	
Carloads	44.65
Ton lots	48.95
Less ton lots	51.45

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.	
80-83% Cr, 60-65% Si, 3.00 max. Fe.	
Carloads	25.65
Ton lots	27.95
Less ton lots	29.45

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.	
16-20% Ca, 14-18% Mn, 53-59% Si.	
Carloads	24.25
Ton lots	26.15
Less ton lots	27.15

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe 1/4 in. x 1/8 mesh.	
Ton lots	20.15
Less ton lots	21.40

Y Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Si 8-11% Mn, packed.	
Carload lots	17.88
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.	
Carload packed	18.60
Ton lots to carload packed	19.65
Less ton lots	20.90

Ferromanganese

Maximum contract base price, f.o.b. lump size, base content 74 to 76 pct. Mn.

Producing Point	Cents per lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	11.75
Johnstown, Pa.	12.75
Sheridan, Pa.	12.75
Philo, Ohio	12.75
St. Duquesne	12.75
Add or subtract 0.1¢ for each 1 pct. Mn above or below base content.	
Brickets, delivered, 66 pct. Mn:	
Carloads, bulk	14.80
Ton lots packed	17.20

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerston, Pa.	
Manganese Silicon	
16 to 19% 3% max.	\$100.50
19 to 21% 3% max.	101.50
21 to 23% 3% max.	106.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.	
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% Fe.	
Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.	
Carloads	85.00
Ton lots	85.00
250 to 1999 lb	35.00
Premium for hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn...	
--	--

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.	
Carloads Ton Less	
0.07% max. C, 0.06% P, 90% Mn	37.15 39.95 41.15
0.07% max. C	35.10 37.90 39.10
0.10% max. C	34.35 37.15 38.35
0.15% max. C	33.60 36.40 37.60
0.30% max. C	32.10 34.90 36.10
0.50% max. C	31.60 34.40 35.60
Mn, 5.0-7.0% Si	28.60 31.40 32.60

Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.	
Carloads bulk	13.80
Ton lots	15.45
Briquet contract basis, carloads, bulk, delivered, per lb of briquet	15.10
Ton lots, packed	17.50

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$100.00 gross ton, freight allowed to normal trade area Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.	
Ton lots	Carloads
96.50% Si, 2% Fe	23.95 22.65
98% Si, 0.75% Fe	24.45 23.15

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.	
Carloads, bulk	7.70
Ton lots, packed	10.60

Electric Ferrosilicon

Contract prices, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.	
60% Si	13.90 75% Si
65% Si	15.65 85% Si
90% Si	19.90 18.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

Cast	Turnings	Distilled
\$2.05	\$2.95	\$3.75
\$2.40	\$3.80	4.55

Ferrovanadium

50-55% V contract basis, delivered, per pound contained V, carloads, packed.	
Openhearth	3.20
Crucible	3.30
High speed steel (Primos)	3.40

Alsifer, 20% Al, 40% Si, 40% Fe.

Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.	
Carloads	10.65¢
Ton lots	11.80¢
Calcium molybdate, 43.6-46.6%	
f.o.b. Langloeth, Pa., per pound	
Contained Mo.	\$1.28

Ferrocolumbium, 50-50%, 2 in. x D

contract basis, delivered per pound contained Cb.	
Ton lots	\$6.90
Less ton lots	6.95

Ferro-tantalum-columbium, 20%

Ta, 40% Cb, 30% C, contract basis, del'd, ton lots, 2-in. x D per lb can't Sb plus Ta.	
Per lb	\$4.95
Carloads, packed	

Ferromolybdenum, 55-75%, 200-lb

containers, f.o.b. Langloeth, Pa., per pound	
Contained Mo.	\$1.68
Carloads, packed	

Ferrophosphorus, electric, 23-26%

car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$4.00 unitage, per gross ton	
10 tons to less carload	\$90.00
Ton lots	\$110.00

Ferrotitanium, 40% regular grade

0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti.	
Less ton lots	\$1.50
Carloads, packed	

Ferrotitanium, 25% low carbon

0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, carload, per net ton	
Carload, bulk	\$215.00
Ton lots, packed	

Ferrotungsten, 15 to 18% high carbon

car lots, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton	
Carload, bulk	\$215.00
Ton lots, packed	

Vanadium oxide, 86-89% V



Structural Steel Fabricated in **IDAHO** **DESTINATION : CHILE**

All the way from Gate City Steel in Boise to Antofagasta, Chile go structural steel components for a 770 ton Burnt Lime Bin. The Bin is part of the Chile Exploration Company's new cement plant being built by the Anaconda Company of New York City

Top engineering, design and fabricating facilities have enabled Gate City Steel to work on this and numerous other unusual projects. In order to see what these facilities can mean for you on your next job, write:

GATE CITY STEEL

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Boise, Idaho



FOR SALE **MODERN** **HEAT TREATING** **FACILITIES** **including**

(3) Holcroft gas tube fired hardening furnaces for carbonitriding or hardening. Temperature range up to 1600° F.

(1) Trayor basket type carbonitriding furnace.

(1) Industrial conveyor type recirculating tempering furnace.

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THE EASTERN MACHINE SCREW CORP., 21-41 Barclay Street, New Haven, Conn.
Pacific Coast Representative: A. C. Behringer, Inc., 334 N. San Pedro St., Los Angeles, California. Canada: F. F. Barber Machinery Co., Toronto, Canada

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MULTIPLE SPINDLE

CHUCKING MACHINES

Four, Five, Six, Eight Spindles • Work and Tool Rotating Type
GOSS & DE LEEUW MACHINE CO., KENSINGTON, CONN.

MUNDT **PERFORATED METALS**

The few perforations illustrated are indicative of the wide variety of our line—we can perforate almost any size perforation in any kind of metal or material required. Send us your specifications.

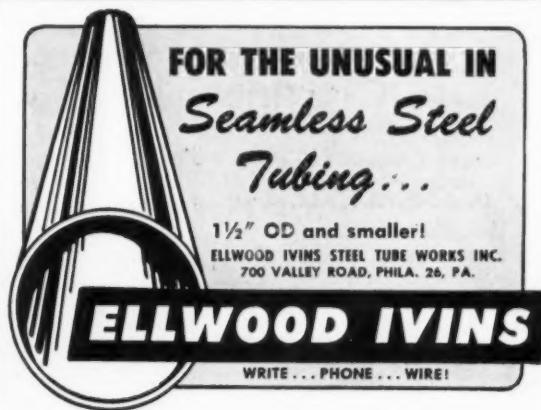
Sixty-seven years of manufacturing perforated metals for every conceivable purpose assure satisfaction.

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TIN, STEEL, COPPER, ALUMINUM, BRONZE
BRASS, ZINC, ANY METAL, ANY PURPOSE

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RAILWAY EQUIPMENT

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Used - As Is - Reconditioned

RAILWAY CARS

All Types

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For All Types of Cars

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SPECIAL OFFERING

50-TON CAPACITY GONDOLA CARS

Length—46'0" Drop Ends
Steel Underframes Steel Ends
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AB Air Brakes

Immediate Delivery!

RAILWAY TANK CARS and STORAGE TANKS

6,000- 8,000- and 10,000-Gallon
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IRON & STEEL PRODUCTS, Inc.

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"ANYTHING containing IRON
or STEEL"

THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Auction Antics . . . If going prices at used machinery auctions are any bellwether of future industrial activity, there is no letup in sight. In Cleveland last week about 350-400 buyers from throughout the East and Middle West moved in for auctioning of well over 1000 lots of stamping, welding and automatic machinery and other equipment from the Apex Electric Mfg. Co. Firm is an appliance producer recently purchased by White Sewing Machine Co. of Cleveland.

two 15-18-year-old latches. The first, a 14 in. x 3 ft center was marked by an experienced dealer for about \$2299 maximum. The figure should be \$2200. When the dealers were through bidding and the users took over, it hit \$4100. A larger 16 in. x 4 ft center went for \$5100. A 10-year-old jig borer with rotary table, tools, etc., went for \$14,000.

A trio of automatic bar machines brought \$14,750 for a 2 in. model, \$8700 for a 1 in. and \$7000 for a 9/16 in. model.

Dealers Bow Out . . . Many professional buyers for dealers threw up their hands at prices coaxed out of users by the auctioneers. Most dealers are finding themselves sticking to the high priced machinery where they already have a buyer ready. On smaller equipment, they are outbid by direct buyers for small plants or workers planning on setting up their own small machine shop.

Some of the latter have their hearts set on one type of equipment and in their excitement are prevented from bidding against themselves only by the experienced auctioneer.

Going, Going, Gone . . . Many bidders go by names known only to themselves and the auctioneer. A wink, slight nod or headshake is a bid. If a known buyer scratched his nose at the wrong time, he could end up owning a \$10,000 machine he didn't want.

Two auctioneers work in shifts from about 10 a. m. through 5 p. m. The auctioneer chants over a loudspeaker from a movable elevated stand pushed by a helper. All machinery and small pieces of equipment are gathered, ticketed and spread on tables. After pieces on top of the table are auctioned, the tables themselves go, followed by a grab-bag "everything that is under the table."

Out Beyond the Maximum . . . Typical sales at Cleveland were

Costs Above New Models . . . Word around the circuit of buyers who follow auctions continually was that in Buffalo earlier in the week a 16 in. shaper 10 years old brought \$5100, about equal to its new price at that time. Comparable new one now costs about \$7500. A No. 1 jig borer, 20 years old, brought \$3500 compared to about \$3400 when it was new.

About the tightest used machinery piece, showing a good example of supply and demand, is a vertical milling machine. Used models of these are now selling for about \$200 to \$500 more than the list price on a new one because of delivery date of over a year.



"Snyder — Can I see you for a moment?"

CONSIDER GOOD USED EQUIPMENT FIRST

BENDER—PIPE

6" U. S. Pipe Bender, Titan Model
BENDING ROLLS
 3" x 3/16" Niagara Initial Type
 10" x 1/2" Niagara Initial Type
 10" x 3/4" King Pyramid Type
 16" x 3/4" Niles Pyramid Type
 30" x 3/4" Niles Pyramid Type

BRAKES—LEAF TYPE

8" x 3/16" Drei & Krump
 12" x 1/2" Drei & Krump

BRAKES—PRESS TYPE

8" x 1 1/2" Goss A
 10" x 2" Superior Hydraulic—NEW

12" x 1 1/2" Superior Hydraulic—NEW

CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton R&M 40' Span 220/3/60 A.C.
 Floor Control—New 1955
 5 ton Whiting 48' Span 230/3/60 A.C.
 5 ton Stoen 56' Span 230 Volt D.C.
 10 ton P&H 40' Span 220/3/60 A.C.
 15 ton P&H 18' Span 230 Volt D.C.
 15 ton R&M 51' Span 230 Volt D.C.
 15 ton Shepard Niles 72' Span 230 Volt D.C.
 25 ton Cleveland 78' Span 220/3/60 A.C.
 With 10 ton Auxiliary

120 ton Niles 68' Span 440/3/60 A.C.
DRAW BENCH

10,000# Actua Standard, Length of Draw 44'. Used to draw S.A.E. 1925 Welded Steel Tubing

FORGING MACHINES

1" to 5" Aeme, Ajax, National

3" Aeme Model XX, Air Clutch, NEW 1945

HAMMERS—BROAD DROP—STEAM DROP—STEAM FORGING—800 lb. to 20,000 lb.

LEVELER—STRETCHER

100 ton Hydr. Stretcher Leveler, Cap. .032" Ga.
 36" Width, 96" Length; 4 Sheets in a Pack

LEVELERS—ROLLER

18" x 12" Standard, 17 Rolls 3 1/2" Dia.
 3" McKay 1000 lb. Rolls 3 1/2" Dia.

PLANER—PLATE EDGE

35" Southwark, Pneumatic Holddowns, Motor Driven, Capacity 1 1/2"

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No. 68 Nazel, self-contained.

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 No. 5 Gisholt ram type Univ. Turret Lathe, 1940.

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 No. 5-48 Cincinatti hydraulic duplex mill, serial 3B51DIK-5.

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1 500	G.E.	250	2300/440
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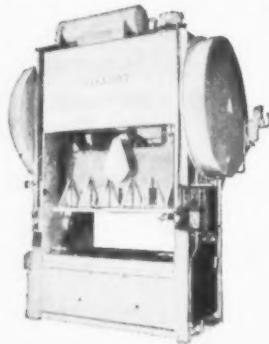


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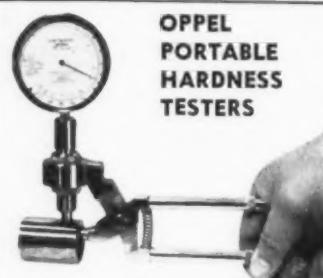
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Jessop Gets Green Light

Federal Judge Henry Brooks has given Jessop Steel Co. permission to take over Green River Steel Corp. (IRON AGE, Feb. 7, 1957, p. 64). Jessop acquires Green River through an exchange of stock and a loan of \$1.5 million for modernization and expansion. Green River went into receivership last year. The plan now goes to bondholders, stockholders and creditors for approval March 4, at which time date of take-over will be set.

Truck Freight Rates Climb

The Interstate Commerce Commission has okayed rate increases for truckers in the East, Midwest, and Rocky Mountain regions. The hikes amount to 5 pct in the West, 7 pct in the East, and 5 pct on freight moving between territories served by the truckers. The advances, applying chiefly to long hauls, are similar to those approved for eastern and western railroads last December.

Congress Cool To Ike's World Trade Bid

President Eisenhower's renewed bid to have the U. S. become a member of the Organization for Trade Co-operation will face tough sledding in Congress. The OTC would administer the existing 33-nation trade agreements program. However, Congressional sentiment appears to be running more toward protection this year.

Canadian Steel Production Grows

Production of steel ingots and castings in Canada totaled 5,305,805 net tons in 1956. This compares with 4,529,401 tons in 1955. The 1956 total represents an operating rate of 96 pct of total capacity for the year. December, 1956, production was 450,138 net tons.

Ask Castings Goals Stay Open

Representatives of the steel castings industry have asked the Business and Defense Services Administration to keep open the expansion goal for steel castings facilities. This goal is the only one in the steel area that is still open. The group contends there is a "dangerous" shortage of steel castings of all types.

Oil Price Probes May Stimulate Export

Probes into gasoline and oil prices by Congressional committees is not likely to result in price controls, even though Sen. O'Mahoney, chairman of one committee, recommends them. Most oil industry critics hope the outcome will be more crude oil shipments for beleaguered Europe. Some companies already are reported cutting back gasoline production to make more crude oil available for export. But the unfavorable publicity resulting from the probes might hurt the natural gas industry's hopes for shaking off federal regulation. Eisenhower recommended that Congress pass such a measure.

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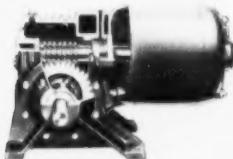
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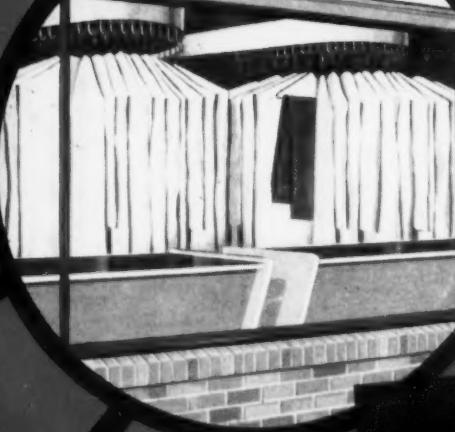
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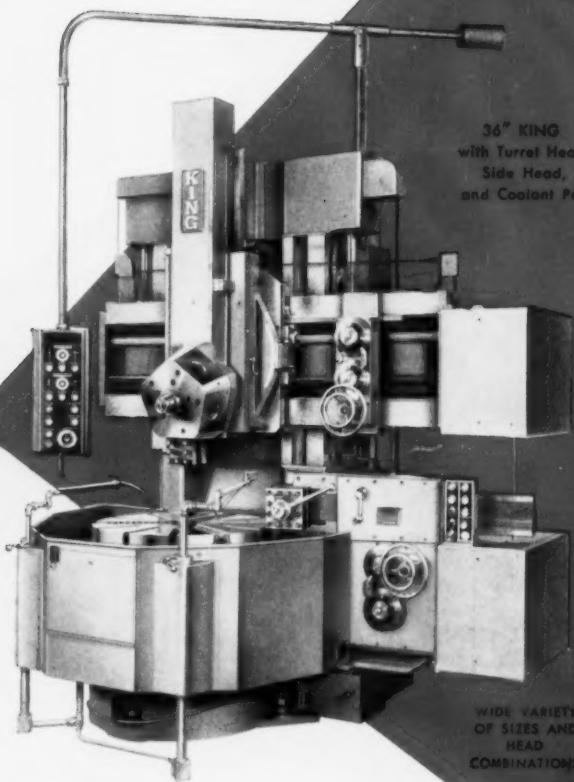
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